

NO.1

— LIGHT UP —

Dec. 2023

風光時刻

環境・永續
Sustainability

當首座風能環教中心遇見地方生態人文：

台中大安地方創生





目錄 Contents

- 再生能源與地方共榮的風光時刻
- 讓潔淨電力點亮在地特色

In the bright moments when renewable energy and local prosperity intersect,
clean energy lights up the distinct characteristics of each region

環境・永續 Sustainability

02

當首座風能環教中心遇見地方生態人文：
台中大安地方創生

When the First Wind Energy-Themed Environmental Education Center Meets the Local Ecology and Humanities: Taichung Da'an Local Revitalization

人物・專訪 Interview

10

達德在台 20 年挑戰不斷 豎起陸風里程碑
曾葳葳看台淨零願景 陸域風電可貢獻

Despite All the Challenges In the Past 20 Years, wpd Achieve Key Milestone For Onshore Wind: Weiwei Tseng's Perspective On Taiwan's Net-Zero Vision, Onshore Wind Power Can Make A Contribution

風光・專題 Insight

18

陸風補光 - 有效使用國有地

Harnessing Onshore Wind Power to Complement Solar Energy - Maximizing the Use of National Land

點亮・在地 Community

26

崙背漫遊：跟隨鄉長腳步，探索風機周遭的美味農產

Exploring Lunbei: Following the Footsteps of the Township Mayor, Discovering Tasty Local Delicacy Around the Wind Turbines

環境
・
永續



當首座風能環教中心遇見地方生態人文： 台中大安地方創生

When the First Wind Energy-Themed Environmental Education Center Meets
the Local Ecology and Humanities: Taichung Da'an Local Revitalization

進入陸域風機內部做近距離的實地探訪、親眼看看當地特有濱海植物大安水蓼衣的成長、體驗被各種招潮蟹包圍的有趣滋味，這都是在參與達德舉辦的環境教育課程中，所能獲得的獨特經驗。

Exploring the inside of an onshore wind turbine up close, observing the growth of the indigenous coastal plant Da'an Hygrophila, and experiencing the fun of being surrounded by various types of fiddler crabs are some of the unique experiences you can gain from participating in wpd environmental education programs.

「達德能源環境教育中心」座落於台中市大安區聯合里民活動中心二樓，是全國首座通過「環境教育設施場所及機構」認證，並以風能永續、環境生態、地方人文為主軸的風能環教場域。

"wpd Environmental Education Center (wpdeec)" is located on the 2nd floor of the Community Center of Daan District, Taichung City. It is the first certified wind energy-themed environmental education facility in Taiwan, focusing on sustainable wind energy, ecology, and local culture and humanity.

台中大安區過去曾是繁榮的大安港貿易口岸，時至今日仍可以透過沿岸的海關歷史遺跡，瞥見昔日聚落繁華的容貌。從前水深港寬的大安港是台灣中部重要的移民登陸口岸，眾多移民的到來，帶動了大安、大甲周遭經濟的繁榮。乾隆、嘉慶年間，大安港不僅成為台灣貨物輸出的重要海口，還設置了砲台，因此海防的地位也日漸提升。

Daan District in Taichung used to be a thriving trading port known as Da'an Harbor, and even today you can still catch a glimpse of the prosperous landscape of the former settlement through its historical sites of the coastal customs. In the past, with its deep waters and wide entrance, Da'an Harbor was an important immigrant landing port in central Taiwan, welcoming numerous immigrants who boosted the economic prosperity of the surrounding areas of Da'an and Dajia. During the Qing Dynasty's Qianlong and Jiaqing eras, Da'an Harbor not only served as a significant maritime gateway for exporting goods from Taiwan, but also had coastal fortifications, solidifying its role in coastal defense.

後來因為洪水衝擊，導致大安港的港灣機能衰退，加上台中梧棲開港以及海線鐵路開通，大安港逐漸褪去繁華外衣成為一個小漁村，現今淺水的港口，偶爾還是可以看見幾艘竹筏隨著漲退潮停駐休憩。

However, due to the impact of flooding and subsequent damage, Da'an Harbor's functionality declined. The opening of Wuqi Port in Taichung and the completion of the coastal railway further led to Da'an Harbor shedding its former glory and transforming into a small fishing village. Nowadays, in the shallow water of the harbor, you can still see a few bamboo rafts occasionally following the ebb and flow of the tide and stopping for rest.

達德的環教中心距離舊有的港口及海岸線僅數百公尺，走上環教中心頂樓，就可以感受到陣陣的海風吹拂。隔著一條溫寮溪，環教中心旁的龜殼生態公



園內佇立的 15 號風機，就是達德能源在台中建置的 44 座風機之一。15 號風機於 2007 年開始商轉，10 年間累積了近 130 場風能教育參訪的經驗，這才成就了「達德能源環境教育中心」於 2019 年取得環保署的認證，正式成為全國首座風能環境教育設施場所。

wpdeec is located just a few hundred meters away from the old harbor and the coastline. As you walk up to the top floor of the Center, you can feel the ocean breeze gently brushing against your skin. Across the Wenliao River, in the Turtle Shell Ecological Park next to wpdeec stands the wind turbine No. 15, one of the 44 wind turbines built by wpd in Taichung. Since

its commercial operation in 2007, nearly 130 wind energy education events were accumulated over a decade. This achievement also led to the official recognition of wpdeec by the Ministry of Environment in 2019, making it the country's first certified facility for wind energy environmental education.

風能生態交響曲：環境教育推廣計畫

Symphony of Wind Energy and Ecology: Environmental Education Outreach Program

風機與環教中心的進駐，成為企業與社區共同維護在地環境、推廣風能教育的支點。在風機建置前，公園原是一片荒蕪，時常被不肖業者任意傾倒廢棄物。隨著風機的規劃設置和環境教育課程的加入，里長、社區居民、企業齊心整理環境，在公園周邊種下防風林、設置生態池，將原本的荒地轉變成河口、潮間帶生態豐富的樣貌，也奠定了生態公園的基礎。

The presence of wind turbines and the environmental education center has become a pivot point for corporations and the community to jointly preserve the local environment and promote wind energy education. Prior to the installation of the wind turbines, the park was a barren land often misused for illegal dumping of waste materials. With the planning and installation of the wind turbines and the introduction of environmental education programs, the local village leaders, community residents, and corporations came together to clean up the surroundings, plant windbreaks and create ecological ponds around the park, transforming the once desolate land into an ecologically rich landscape of estuary and intertidal zones and laying the foundation for the ecological park.

達德能源環境教育中心的核心宗旨為「推廣風能教育，追求環境永續」。在環教中心設置之初，就希望能透過課程讓參與者認識風力發電的原理，並藉由實地體驗探索龜殼生態公園，培養對於自然生態與潔淨能源永續發展的理解，以共同關切氣候變遷議題，實踐環境永續的理念。

The core mission of wpd Environmental Education Center is to promote wind energy education and pursue environmental sustainability. Since the establishment of wpdeec, the vision has been to help participants understand the principles of wind

power generation and foster the appreciation of natural ecology and the sustainable development of clean energy through on-site experiences in the Turtle Shell Ecological Park. This is intended to collectively address climate change concerns and put the concept of environmental sustainability into practice.

在環教中心的經典課程中，可以看見以風能為主軸，延伸至「人與環境的關係」、「人對風的運用」、「培養珍惜資源的態度與行動」的三個主概念，並層次性的帶入風的產生、風力能源的發展與生態環境三個主題，以此凝聚更多再生能源友善共識與環境永續的信念。

In the classic courses of wpdeec, wind energy takes center stage and extends to three core concepts: "The Relationship Between People and the Environment," "Human Utilization of Wind," and "Fostering Cares and Actions in Resource Conservation." These principles are intricately woven into three interconnected themes: the origin of wind, the development of wind energy, and the ecological environment, so as to unite more renewable energy-friendly consensus and the belief in environmental sustainability.

風機的探索

Exploration of Wind Turbines

此課程以探索風機為核心，藉由環境科學實作探索風機設立與環境的關聯，並進入風機內部體驗，認識風機的特質、結構和風力發電運作過程，理解再生能源能降低碳排放量與對環境產生的影響，以美國學者賴斯 (L. Rath) 在 1957 年提出的價值澄清教學法，讓參與者能透過課程，經由自我選擇、分析、決定，並建立屬於自己對環境的價值觀，引發參與者對風能的關注與環境友善思維。

This course focuses on the exploration of wind turbines. It utilizes hands-on environmental science activities to explore the relationship between the wind turbines and the surroundings. The participants will gain an understanding of the wind turbine's characteristics, structure, and the process of wind power generation as well as comprehend how renewable energy can reduce carbon emissions and its impact on the environment by entering the inner space of the wind turbine. This aligns with the concept of Value Clarification Teaching proposed



by American scholar L. Rath in 1957. Through the course, the participants are enabled to make self-selected choices, analyze information, make decisions, and ultimately form their own values on environment. This, in turn, enhances participants' interests in wind energy and environmentally friendly thinking.

風電的奧秘

The Mystery of Wind Power

此課程運用課堂講述、手作 DIY、實地體驗，帶領參與者認識全球暖化與資源消耗的關聯，理解發展再生能源的重要性，並進一步認知風力發電的原理，期許能激發參與者關心再生能源相關議題，並願意將所學以行動落實，實踐綠生活。





This course combines classroom lectures, DIY activities, and field experiences to lead participants in understanding the correlation between global warming and resource consumption. It emphasizes the importance of developing renewable energy and delves into the principles of wind power generation. The goal is to inspire participants to take an interest in renewable energy issues, motivate them to realize what they've learned into action and embrace a greener lifestyle.

大安風神榜

Wonder Life of Da'an

本課程探討濱海嚴峻的自然條件，了解居住在河口潮間帶的生物和居民們有哪些因應當地特殊環境而發展出來的生存策略。課程包含認識潮間帶、觀察潮間帶螃蟹等生物因應環境而有的特徵與習性，並透過風能生態的遊戲設計，瞭解濱海居民於防風林樹種的運用與種植策略。

This program explores the tough natural conditions of the coastal area and the survival strategies developed by the aquatic organisms and residents living along the intertidal zone and the estuary between water and land. The activities encompass an introduction to the intertidal zone, observation of the distinctive features and behaviors of intertidal crabs and other organisms, and, through the design of wind energy ecology games, an understanding on how coastal residents utilize windbreak forests and their planting strategies.

從與環教中心鄰近的機構合作開始，達德將永續和環境教育的漣漪擴大，鄰近的海墘國小就是達德能源環境教育中心第一所「綠能種子學校」！達德贈送海墘國小多套風機與太陽光電車模組教具，贊助風能生態教室布置，協助學校進行環教教案，並引介德國經濟辦事處的 CSR Day 至海墘國小發聲，讓多家德商一同參與、提供教案，也實地進行一日教學。專業環教講師帶領老師與孩子們實地走訪環教中心周遭的風力發電機，在孩子心中落實永續能源的理念。

Starting from the collaboration with the neighboring institutions, wpd has extended its sustainability and environmental education concept to the neighboring Hai-Chian Elementary School as the first "Green Energy Seed School" of wpdeec! wpd donated several

wind turbines and solar power vehicle module teaching aids to Hai-Chian Elementary School, sponsored the setup of a wind power eco-classroom, assisted in developing environmental education curricula, and facilitated connections with the German Trade Office so many German businesses participated and contributed to teaching activities for the annual CSR DAY in Hai-Chian Elementary School! Professional environmental education instructors guided teachers and students on field visits to the wind turbines surrounding wpdeec, instilling the idea of sustainable energy in the hearts of the children.

而從台中一路往北，在苗栗有達德能源於 2022 年起認養的海巡署龍鳳海洋驛站（白海豚海洋驛站），以及桃園的草漯沙丘地質公園等作為環境教育合作場域。達德將點與點串聯，期盼形成一個帶狀的永續生態區域，提供民眾近距離認識風力發電，瞭解達德能源在台灣優良的風資源基礎上，如何協力社區保育生態環境、推廣風能教育、追求環境永續，並建立美好家園的努力。

From Taichung towards the north, in Miaoli, there is the Longfeng Ocean Service Station (also known as the Chinese White Dolphin Ocean Service Station) that wpd has been supporting since 2022 in partnership with the Coast Guard Administration. Further north, in Taoyuan, there's the Caota Sand Dunes Geopark. These locations have become essential hubs for collaborative environmental education. This network offers the public a close-up understanding on wind energy. It showcases that based on Taiwan's excellent wind resources, how wpd collaborates with communities to conserve ecological environments, promote wind energy education, pursue environmental sustainability, and endeavor to build a better homeland.



人物 · 專訪

Interview

達德一路 22 年挑戰不斷 豎起陸風里程碑 曾葳葳看台淨零願景 陸域風電可貢獻

Despite All the Challenges In the Past 20 Years, wpd Achieve Key Milestone For Onshore Wind: Weiwei Tseng's Perspective On Taiwan's Net-Zero Vision, Onshore Wind Power Can Make A Contribution

W / 採訪報導
Interview by W

今年 5 月 24 日，達德能源宣告在台完成第 200 座陸域風機，樹立嶄新里程碑。在台扎根長達 20 年，一路行來可說筆路藍縷，克服許多溝通挑戰後才達成此成就。面對接下來 2050 年台灣淨零願景，達德能源董事長曾葳葳深信，以陸域風電的穩健彈性，絕對能在其中繼續扮演一定貢獻。

On May 24th of this year, wpd announced the completion of its 200th onshore wind turbine installation in Taiwan, marking a significant milestone. wpd has established a strong presence in Taiwan for impressive 20 years. It's been a challenging path, marked by overcoming various communication hurdles to reach this accomplishment. Looking ahead to Taiwan's 2050 net-zero vision, Weiwei Tseng, Chairperson of wpd Taiwan Energy, firmly believes that onshore wind power, with its reliability and adaptability, will continue to play a vital role in supporting this ambitious goal.

截至 10 月底止，達德陸域風機數已達到 206 座，裝置容量超過 500MW，占全台陸域一半以上，一年可發出 12 億度電，供 29 萬多戶家庭使用，數量甚至超過台電。

As of the end of October, wpd has already installed 206 onshore wind turbines with total capacity of more than 500MW, accounting for more than half of Taiwan's onshore wind market. The electricity production of 1.2 billion kWh per year can supply for more than 290,000 households, exceeding what the utility company Taipower can generate from its onshore wind business.

談到達德為何那麼早就獨具慧眼看中台灣風能，曾葳葳解釋，台灣海峽是一個峽口，風進來之後很像喇叭有放大作用，海峽效應加上東北季風，中北部的風力可說是相當好，因此很早就從苗栗、桃園開始尋找點位。

When it comes to why wpd had the foresight to invest in Taiwan's wind energy sector at such early stage, Weiwei Tseng explained that the Taiwan Strait acts as a funnel, amplifying the wind once it enters, and the combination of the strait effect and the northeast monsoon results in excellent wind conditions in the central and northern regions of Taiwan. Therefore, back in the early days, Miaoli and Taoyuan are the focus of siting.

面對反對開發聲浪，耐心溝通是關鍵 Facing opposition, communication with patience is essential

在進入台灣市場的多年後，一直到 2006 年才成功完成首座風機商轉，這也說明這條路不那麼好走。當時本地對風力發電還很陌生，民眾的疑慮、反對聲浪不斷。尤其 2012 年，苗栗苑裡發起「反瘋車抗爭」，時常佔據新聞版面，足見任何開發案都難以避免民意衝擊。

The first wind power project was not realized until 2006 after entering Taiwan for several years, and it illustrates the difficulties encountered on this path. At that time, local communities were unfamiliar with

wind energy, and there was continuous skepticism and opposition from the public. Particularly in 2012, there was a significant protest against wind power in Yuanli, Miaoli. This protest often made headlines, and it becomes obvious that no development project can avoid public resistance.

對於一路 20 年來的挑戰，曾葳葳歸納兩個部份是最困難，一個是「土地的需求整合」，另一個是「民意溝通」。

Throughout the 20-year journey, Weiwei Tseng summarized that two aspects are particularly difficult: one is "integration of land requirements," and the other is "public communication".

最早陸域開發從台西的中北部開始，土地不是林務局，就是國產署，國有地相對單純。可是後來開始往南移動，遇到私人土地問題就出來了。即使是國產署、河川局的公有土地，上面也會有承租戶或佔有戶，整合上變得更加棘手。

Onshore wind development was initially started from the central-northern part of Taiwan, often involving lands managed by the Forestry Bureau or the National Property Administration. These government-

owned lands were relatively easy to acquire. However, as the development expanded southward, private landownership issues emerged as a significant challenge. Even government-owned lands under the jurisdiction of the National Property Administration or River Management Bureau had leaseholders or occupants, making the integration process much more complex.

曾葳葳語重心長地說到，通常公家機關就是丟給業者自己去排解，「問題是，有時候一座風機涉及的地主多達 5 到 10 個，甚至更多，只要少一個我就做不成，壓力非常的大！」

Weiwei Tseng said reluctantly, the public agencies typically leave it to the developers to figure out. She said, "The problem is, there may be 5 to 10, or even more land owners on the lands needed for one onshore wind turbine. We can't make it even with only one disagreement, so the pressure is immense!"

陸域風機開發，最常碰到的反對是風機噪音，另外輸電線路經過、環團關心的鳥類生態等，也都要面對。「很多時候只是因為民眾不了解，會擔心害怕，其實很多問題都可以解決。」



In onshore wind power development, the most common opposition often revolves around concerns related to wind turbine noise, the passage of power transmission cables and ecological considerations on bird that environmental groups are concerned about. Weiwei Tseng explained, "it's simply due to a lack of public understanding, leading to worries and fears. In reality, many of these issues are quite solvable."

像是風機葉片，會有一個比較彎鉤的設計，就有減噪效果。在家戶端，則能藉由改善隔音窗方式去處理。

As an example, wind turbine blades with a more curved design can effectively reduce noise. On the household level, noise issues can be addressed by improving soundproofing in windows.

台灣跟歐洲有一個很大的不同點在於，台灣常常很多開發案程序都過了，最後還是突然莫名會被卡關。因為有反對聲音，已核可開發案因此動不了工，這就是在台灣開發風電的難處。她提及，像在德國會先有完整的諮詢過程，這個階段要去跟利害關係人討論，可能花掉比較長時間，可是後面主管機關一旦核可，大家就不能再表示意見，給業者一個確定性。「但台灣比較不一樣，民意隨時隨地都可以跳出來表達…」曾葳葳誠實地說。

The major difference of development in Taiwan and Europe is that many development projects in Taiwan often navigate through all the required procedures and receive approvals, but then encounter unexpected roadblocks. Approved projects can come to a halt due to opposition, and this is the difficulty of developing wind energy in Taiwan. She mentioned that in countries like Germany, there is an initial consultation process that involves discussion with stakeholders. While this phase may take more time, once the supervisory authority gives its approval, further objections cannot be raised, providing a level of certainty for the businesses. "But in Taiwan, public opinion can be expressed anywhere, anytime..." Weiwei Tseng honestly said.

晨昏定省，以耐心與居民培養互信

"Morning and evening greetings," patiently building trust

面對台灣特殊地方生態，達德必須得入境隨俗，也慢慢磨出一套溝通技巧。曾葳葳笑說，第一招就是「晨昏定省」。要讓鄉親覺得隨時都找的到你，要吃飯要喝酒談事情都可以這樣，且最好十分鐘、半小時內抵達，隨傳隨到。

Facing Taiwan's unique local culture, wpd had to adapt and gradually developed a set of communication skills. Weiwei Tseng smiled and said that the first strategy is "morning and evening greetings." "All-time reachable" is the key to the local

community, no matter it's for a meal, a drink, or a business discussion. What even better is to show up within ten minutes or half an hour.

地主或使用者關心的補償，自然不可少，順便再敦親睦鄰一下，比如幫忙把路修一修、水管移一移，多創造一些附加價值。

Furthermore, compensation for landowners or users is definitely a key, and value addition can be created by offering them further improvements such as road repair or water pipe relocation, as friendly neighboring measures.

但台灣人可愛也在這裡，一開始他可能不贊成，久了有互信，慢慢變成朋友，還會反過來幫忙當說



客，說服其它反對的人，甚至還主動提供自己土地希望多蓋一些風機。

People in Taiwan are endearing. At first, there might be opponents, but over time when mutual trust develops, opponents sometimes become friends and even the advocates to persuade others who are against the project. In some cases, they also generously offer their own lands, hoping for more wind turbines to be installed.

曾葳葳總結秘訣，就是要「博攞」(puân-nuá; 台語，指互動交朋友)。尤其地方很重承諾，口頭上隨意講出的一句話，他們都很在意，不能像台北人說下次吃個飯，但常常沒下次，這在地方絕對不行。

Weiwei Tseng summarized the key as "puân-nuá" (Taiwanese Hokkien; meaning interaction and companionship). Especially in local communities, commitments are highly valued. A casually spoken sentence carries significant weight, and unlike in Taipei, where saying, "Let's have a meal next time," often doesn't lead to an actual meeting, in local communities, this is definitely not the case.

未來發展策略，小而美也可以 Future development strategy - small yet beautiful approach

面對台灣 2050 走向淨零碳排願景，達德的下一個 20 年可以扮演甚麼角色？曾葳葳是對陸域風電的存在深具信心，認為這是一個可以長期永續、逐步經營進展的能源。

With Taiwan's vision of achieving net-zero carbon emissions by 2050, what role will wpd play in the next two decades? Weiwei Tseng firmly believes that onshore wind power is an energy source that can be steadily developed in the long run.

對陸上風機面臨年限壽命問題，她說首先會考慮延役，畢竟機械設備都還可用，可以先考慮延役 5 到 10 年。再來就是可以換效益更好的大型風機，持續做好營運。

Regarding the lifespan of onshore wind turbines, she mentioned that the first priority would be extending the service life for 5 to 10 years if the mechanical

equipment is still functional. Additionally, repowering can be considered to use larger turbines that offer better energy production efficiency, so the operation can keep going.

新增風機方面，曾葳葳指，未來達德在陸風上策略，將走局部發展，「小而美」路線，一次 3 座、5 座都好。公司評估台灣中部的沿海、港口，或是北部偏山區處，都還有插旗空間。

In terms of installing new wind turbines, Weiwei Tseng highlighted that wpd's future strategy for onshore wind power will revolve around local development, emphasizing the "small yet beautiful" approach. Whether it's adding three or five turbines at a time, the company is flexible. wpd is currently assessing potential locations along Taiwan's central coastline, at ports, and in the hilly areas of the northern region, all of which offer opportunities for expansion.

淨零碳排應透過多元綠能途徑

Net-zero carbon emission should be achieved through a variety of green energy approaches

然而風電雖是從陸上開始，但自從台灣政府大力推動離岸風電後，這幾年明顯不再成為關愛焦點，政府綠能政策資源全跑到海外風機去，陸風有漸受冷落之感。

However, while wind power development is originally started from onshore, in recent years, it has become less of focus. The Taiwanese government has been strongly promoting offshore wind power, leading to a noticeable shift in green energy policy resources towards offshore wind. Onshore wind power has been feeling somewhat neglected.

對此曾葳葳也深深有感，但她指出，全世界走向淨零碳排，需要透過很多的途徑一起達成，尤其台灣地狹人稠，資源相對有限，「再生能源的型態應該要多元，不能只壓實在一、兩種，我覺得台灣沒有這個本錢。」

Weiwei Tseng also feels deeply about this, but she pointed out that achieving net-zero carbon footprint worldwide requires multiple approaches working together. Especially in a densely populated and resource-limited place like Taiwan, "The types of

renewable energy should be diversified. I think Taiwan cannot afford to bet on only one or two types."

在離岸風電開發，海上也有眾多因素干擾，建設時程上有比較多不確定性。曾葳葳認為，這中間應該要搭配其它綠能逐步前進，陸域風電就是適合穩健經營的一個綠色能源。它有分散型優點，加上是點狀式開發，相比離岸可調整彈性更大。

During the development of offshore wind power, numerous factors at seas may lead to uncertainty of construction timeline. Weiwei Tseng believes that amid this situation, it's essential to have other forms of green energies promoted simultaneously, and onshore wind power is a suitable option for steady operation. It has the advantage of being decentralized, and its point-like development allows for greater flexibility compared to offshore wind power.

對於 2050 淨零時程，她提醒其實沒有很遠，畢竟很多事情推動都要花 10 年以上，不只是陸風，各個能源政策都一樣，可是如果現在不開始處理，到時都會很難推行。

In regard to the 2050 net-zero timetable, she cautions that it's not too far off, as many endeavors require over a decade to come to fruition. This isn't exclusive to onshore wind power; it applies to all energy policies. If we don't begin to address these matters now, it will be challenging in implementation when the time comes.

雖然陸域風電成熟，缺少官方關愛眼神，但基於上述穩健彈性的重要，曾葳葳期許政府，對於單點個案與地方溝通，還是可以幫忙發聲，並協調各單位，有一點資源放在上面，讓不管是離岸，或是陸域風電，各種能源都能在台灣蓬勃發展。

Despite the maturity of onshore wind power technology, it often lacks official attention. Nevertheless, given its crucial importance in terms of stability and flexibility, Weiwei Tseng hopes that the government can still help to speak out on individual cases and communicate with the local community. By coordinating various agencies and allocating some resources, the government can ensure the thriving development of all types of energy sources, no matter it's offshore or onshore wind in Taiwan.

風光・專題



陸風補光 - 有效使用國有地

Harnessing Onshore Wind Power to Complement Solar Energy – Maximizing the Use of National Land

金屬工業研究發展中心 張瑞模 / 撰稿
Metal Industries Research and Development Center Re-Mo Chang

近年來全球極端氣候不斷的出現已逐漸威脅到人類的生存，面對地球暖化與頻繁的極端天氣，如何防止全球暖化並落實節能減碳已成為人類重要的課題，今年夏季 7 月已出現全球觀測史上最熱的月份，聯合國秘書長表示，全球暖化時代結束，地球正式進入「沸騰時代」，面對地球暖化與頻繁的極端天氣及進入沸騰時代，已成為各國須面對的重要議題。第 26 屆聯合國氣候變遷大會（簡稱：COP26）通過《格拉斯哥氣候公約》，將全球氣溫升高幅度控制在攝氏 1.5 度以內作為目標，以及逐步減少煤炭使用。台灣能源 90% 仰賴化石燃料進口，為因應環境惡化與能源短缺，我國正邁入能源轉型的關鍵時刻，因此如何推動能源轉型並且達到減碳的雙重目標，同時能降低進口能源的依賴，帶動我國綠能科技與產業推升及落實能源轉型，發展風力發電是台灣絕佳的選擇與捷徑。

In recent years, the constantly global extreme weather has gradually threatened the survival of humanity. Facing the global warming and frequent extreme weather events, how to prevent global warming and implement energy saving and carbon reduction has become an important issue for mankind. This summer, the month of July has already appeared as the hottest month in the history of the global observing, and the Secretary-General of the United Nations has remarked that the global warming era is over, and the era of global boiling has arrived. Facing global warming and frequent extreme weather events and entering the boiling era, which has become an important issue for all countries to confront. The 26th

UN Climate Change Conference (COP26) adopted the Glasgow Climate Pact, which aims to limit the global temperature rise to 1.5 °C and to gradually reduce coal consumption. Taiwan currently relies on fossil fuel imports for 90% of its energy needs. In response to environmental degradation and energy scarcity, the country stands at a pivotal moment in its journey towards energy transformation. Hence, how can we propel energy transition to achieve the dual goals of carbon reduction and reducing energy import dependency while driving the advancement of our country's green energy technology and industry, and affectively implementing energy transformation? The development of wind power is an excellent choice and shortcut for Taiwan.

風力發電建置現況與發展分析 Current Status and Development Analysis of Wind Farm Installation

依據 MAKE Consulting 資料顯示，2017 年全球風力發電新增裝置量約為 49,219MW，較 2016 年 52,414MW 下降 6.1%，2018 年全球風力發電新增裝置量則約為 54,751MW，較 2017 年成長 11.2%。預估 2025 年全球風力電裝置量將突破至 62,963MW，5 年內成長率超過 15% 以上。

According to MAKE Consulting, the global wind power installed capacity was approximately 49,219MW in 2017, a decrease of 6.1% from 52,414MW in 2016, while the global wind power installed capacity was approximately 54,751MW in 2018, an increase of

11.2% from 2017. It is estimated that the global installed capacity of wind farm will break through to 62,963MW in 2025, with a growth rate of more than 15% within 5 years.

我國目前發展再生能源，主要是以建置風力發電與太陽能發電雙主軸為主，其他如地熱能、生質能、海洋能、非抽蓄式水力等發電為輔，依據行政院風力發電建置目標，至 2025 年風力發電累計裝設 6.7GW(陸域 1.2 GW+ 離岸 5.5GW)，預估 2025 年離岸風電年發電量可達 198 億度，達成 2025 年再生能源發電量占比達 20% 目標。而依據今年 6 月能源局資料顯示，目前陸域風電累計設置容量為 851MW，離岸風電累計設置容量為 1157MW，年累計發電量約為 75 億度，年可減排二氧化碳 376 萬噸。

The current development of renewable energy in Taiwan is mainly based on installing wind farm and solar farm, supplemented by other power generation such as geothermal energy, biomass energy, ocean energy, and non-pumped storage hydroelectricity, etc. According to the Executive Yuan's target for wind farm construction, 6.7GW of wind farm will be accumulated and installed by 2025 (1.2GW onshore + 5.5GW offshore), and it is estimated that the annual electricity generation from offshore wind power will reach 19.8 billion kWh by the year 2025, which will reach the target of 20% of renewable energy generated in 2025. Based on the data from the Bureau of Energy in June this year, the cumulative installed capacity of onshore wind power is 851MW, and the cumulative installed capacity of offshore wind power is 1,157MW, with an annual electricity generation reaches approximately 7.5 billion kWh,

which can reduce carbon dioxide emission by 3.76 million tons per year.

顯然陸域與離岸風電建置進度明顯落後，而近年來政策上明顯以推動離岸風電的建置為主，然而離岸風電建置的技術門檻、海洋點位、國產化落實及躉購電價議定的困難度等因素，在在影響離岸風電的建置進度，而目前陸域風電，不論在 2MW 至 5MW 等風力機的建置在技術上與建置上及國內業者零組件生產技術相對成熟，因此政策上協助陸域風電開發，仍是國內仍須努力的目標。

Evidently, the progress in onshore and offshore wind power installation is significantly delayed, and the policy in recent years obviously focuses on promoting the installation of offshore wind power. However, factors such as the technological requirements, the selection of suitable offshore sites, the difficulties in achieving domestic production and the complexities of negotiating power purchase agreements have been significantly affecting the progress of offshore wind power installations. At present, the onshore wind power, regardless of the installation of wind turbines ranging from 2MW to 5MW, is technically



▲ 【圖 1】所示為陸域風力發電系統機艙內部構造圖（圖片來源：張瑞模授權使用）
Figure 1. Internal structure of an onshore wind turbine's nacelle (Image source: Authorized by Re-Mo Chang)



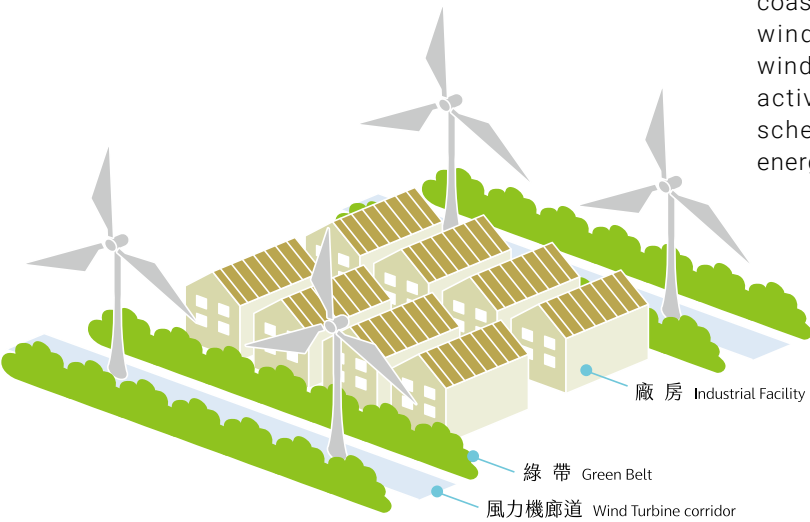
▼ 【圖 2】所示為 Enercon E-82 機型風力發電系統機艙，採用直驅式發電機 (Gearless) 無齒輪箱設計的問題（圖片來源：張瑞模授權使用）
Figure 2. Nacelle of the Enercon E-82 wind turbine, which incorporates a gearless design for the direct-drive generator (Image source: Authorized by Re-Mo Chang)

mature in technology and installation, and the components production technology of domestic companies is relatively mature. Therefore, supporting the development of onshore wind power remains a crucial goal domestical.

陸風補光 -
有效使用國有地以風補光促發綠電商機

Harnessing onshore wind power to complement solar energy – Maximizing the use of national land for wind-solar integration to drive green energy business opportunities

為加速國內再生能源的發展，有效使用國有地、新開發工業區、公共建設等建置陸域風力發電，以風力發電來彌補太陽能光電場使用農漁用地的疑慮，以儘早達到陸域風電建置 1.2 GW 容量的目標，如圖 3 為工業區設置陸域風力發電示意圖。

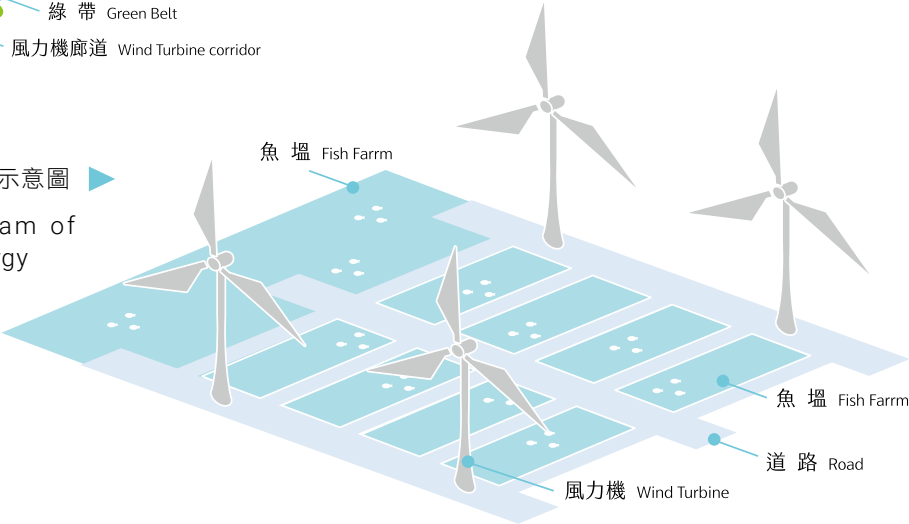


【圖 3】工業區設置陸域風力發電示意圖

Figure 3. Schematic diagram of building an onshore wind farm in industrial zone

【圖 4】魚塢設置陸域風力發電示意圖

Figure 4. Schematic diagram of building an onshore wind energy in fish farm



In order to speed up the development of domestic renewable energy, effectively utilize national land, newly developed industrial zones, and public construction etc., to build onshore wind farm. Use wind energy to complement for the concerns about the use of agricultural and fishery land for solar farms, so as to achieve the goal of building 1.2 GW capacity of onshore wind farms as soon as possible, as shown in Figure 3, a schematic diagram of building an onshore wind farm in the industrial zone.

另一方面，台灣海峽西部沿海地區有極佳的風場，如中台灣如苗栗、台中、彰化、雲林、台南等地區，沿海魚塢密布，可應用養殖魚塢地區建置風電場，規劃利用魚塢道路建置風力機，而不影響魚塢養殖活動，如圖 4 為魚塢設置陸域風力發電示意圖。

On the other hand, there are excellent wind farms in the coastal areas in western Taiwan near the Taiwan Strait, such as Miaoli, Taichung, Changhua, Yunlin, Tainan and other areas in Central Taiwan, where fish farms are densely clustered along the coast. Aquaculture fish farms can be used to build wind farms, utilizing fish farm roads to install wind turbines, without affecting the aquaculture activities in fish farms, as shown in Figure 4, a schematic diagram of building an onshore wind energy in fish farm.



國有地開發採競合制促進陸風及綠能土地使用效率

Promoting onshore wind and green energy land-use efficiency through a coopetition system on national land

目前國有財產署主要係依「國有非公用土地提供申請開發案件處理要點」(取得電業籌設許可前之階段)以及「國有非公用財產委託經營實施要點」(取得電業籌設許可後之階段)之規定辦理，有關國有非公用土地提供予再生能源發電業(風電、光電等)開發利用事宜，國有財產署目前所採行許可制提供申請開發同意書之發給。

Currently, the National Property Administration mainly follows the provisions of the "Directions for Provision of National Non-public Use Land Apply for Development" (the phase before obtaining the establishment permit) and the "Directions for Consigned Operation Business of National Non-public Use Property" (the phase after obtaining

the establishment permit). Regarding the matters of providing the national non-public utility land to the renewable energy power generation industry (wind power, solar power, etc.) for development and utilization, the National Property Administration currently adopts the approval system to provide the application form for the acquisition of a certificate of approval for the development of the land.

然而此方式一旦有業者針對某一筆國有土地先行向國有財產署申請並取得申請開發同意書，則其他業者即無法在同一筆土地進行開發或利用規畫等，例如針對陸域風電開發而言，對於無開發能力之業者長期佔據國有土地之開發使用地位或本身無專業開發能力、或無意從事開發之業者，肆意先行圈地搶先申請，並尋求讓渡開發權利機會而謀取權利金等方式，實為不利於再生能源發電業者的國土利用與發展。並將導致真正具實力且從事實際開發之業者卻步，甚至已經預先取得原承租人承租權拋棄書或意向書之業者被變相被排除在外，只因有投機業者先行申請。



結論

Conclusion

為面對地球暖化與頻繁的極端天氣及進入沸騰時代，發展再生能源，建置風力發電，落實能源轉型並可帶動我國新的綠能產業的發展是台灣企業升級轉型的絕佳選擇與契機。

Facing global warming and frequent extreme weather events, and entering the era of global boiling, developing renewable energy, building wind farms, implementing energy transformation, and driving the development of new green energy industries in Taiwan are the best choices and opportunities for Taiwan's enterprises to upgrade and transform.

政府政策上應協助有心投入陸域風電之開發商，提供適時的申請開發程序與創新作法，並可委由專家先進行實質審查廠商資格與時續能力等，適當的選擇風場極佳的國有地精準規劃建置風力機，可補足2025年風力發電累計裝設6.7GW的政策目標，另一方面針對新設工業區、或既有工業區更新等國有地，規劃建置風力發電，提供工業區設廠廠商，取

得綠能碳權，落實減碳方案，以促進工業區內自主碳權的取得與帶動綠電商機。

The government policy shall assist developers who are committed to investing in onshore wind farms by providing proper development procedures and innovative approaches, and by appointing experts to conduct a substantive review of the qualifications and performance of companies. Properly selecting excellent wind farms in national land for precise planning and building wind turbines can fulfill the policy target of cumulative installed wind power capacity of 6.7GW by 2025. On the other hand, for national land such as newly established industrial zones or existing industrial zones to be redeveloped, planning for wind power installation can be implemented. This would offer manufacturing companies in industrial zones with the opportunity to obtain green energy carbon credits, thereby realizing carbon reduction initiatives. This approach aims to encourage the acquisition of self-owned carbon credits within the industrial zones and drive green power business opportunities.

參考資料

1. 張瑞模，台灣風力發電現況與關鍵零組件技術發展趨勢分析，地中海亞洲海洋聯盟 Re-Mo Chang, "Current Situation of Taiwan's Wind Farm and Analysis of the Development Trend of Key Component Technology," Mediterranean and Asia Marine Alliance.
2. 林其加、張瑞模、潘永寧，“大型風力機之關鍵球墨鑄鐵件之鑄造技術，”鑄造工程學刊 (J. of Taiwan Foundry Society), 第38卷第2期 (第153期), Pp.26-34, June 2012. Chi-Chia Lin, Re-Mo Chang, and Yung-Ning Pan "Development of Key Ductile Cast Components Used in Large-scale Windmills," Journal of Taiwan Foundry Society, vol. 38, no. 2 (No. 153), Pp. 26-34, June 2012.
3. 潘永寧、莊雅筑、張瑞模、吳明岩、黃加再、陳瓊肯，“大型離岸風力發電機 (3~5MW) 之輪轂及機座鑄件之鑄造技術研發，”2015年台灣風能學術研討會，台大醫院國際會議中心，2015年12月7日。Yong-Ning Pan, Ya-Chu Chuang, Re-Mo Chang, Ming-Yan Wu, Jia-Zai Huang, and Ching-Ken Chen, "R&D of Casting Technologies for Hub and Machine Base Casting of Large-Scale Offshore Windmills (3~5 MW)," 2015 2015 Academic Symposium of the Taiwan Wind Energy, NTUH International Convention Center, Dec. 7, 2015.
4. 行政院與能源局網站資料。Information on the websites of the Executive Yuan and the Bureau of Energy.
5. 我國風力發電產業發展現況與未來展望，經濟部產業拓展處。Current Status and Future Prospects of the Wind Power Industry in Taiwan, Industrial Development Administration, MOEA

However, in such way, once a company applies to the National Property Administration for a certain national land and obtains the approval for development, other companies will not be able to carry out the development or utilization planning on the same land. For example, for the development of onshore wind farm, those who do not have the ability to develop and occupy the development and utilization status of the national land for a long period of time, or those who are not capable of developing the national land or who are not interested in developing the national land, but want to apply for the enclosure of land and seek to transfer the opportunity of development rights to obtain royalties, etc. This is in fact not conducive to the land use and development of renewable energy power producers. It will also discourage those who are genuinely capable and engaged in actual development, and even those who have already obtained a waiver or letter of intent from the original lessee in advance will be virtually

excluded, simply because speculative applicants have applied ahead of them.

建議應有創新作法，如改採競合制較合乎實質國土開發利益，即開放多家業者可在一定期間內取得國有土地提供開發資格，並以最先取得許可開發（如籌設許可）且提出完善申請取得使用之業者取得最終取得土地使用權利者，且具有優先使用權等。

It is suggested that innovative approaches should be considered, such as adopting a coopetition system that better serves the genuine interests of national land development. This would involve allowing multiple entities to qualify for national land development rights within a defined period., The first company who obtains the approval for development (e.g., establishment permit) and submits a comprehensive application for land use should be granted the ultimate right to land usage, along with priority usage privileges.



點亮 · 在地

community

Lunbei



崙背漫遊： 跟隨鄉長腳步，探索風機周遭的美味農產

Exploring Lunbei: Following the Footsteps of the
Township Mayor, Discovering Tasty Local Delicacy
Around the Wind Turbines.

蔡佩旻／撰
Writer/ Tsai Pei-Min

崙背鄉位於雲林縣西北部，北面是濁水溪、南面為新虎尾溪，西接麥寮鄉、東臨二崙鄉，因地處交通要衝，早期有「小上海」之稱，如今日換星移，在交通與生活環境改變下目前人口數約 2 萬 2 千人，其中詔安客家族群約佔 4 成，為雲林境內唯一的客家重點發展區域。崙背鄉更為國內重要的酪農專區，主要農特產洋香瓜更是揚名國際。

Lunbei Township is located in the north-western of Yunlin County, with Jhuoshuei River to the north, Xin Huwei River to the south, Mailiao Township to the west, and Erlun Township to the east. Being located at the center of the transportation hub, Lunbei Township was known as "Little Shanghai" in the early days, but nowadays, due to changes in transportation and living conditions, the current population is about 22,000 people, with about 40% of them being Zhao'an Hakka group, making it the only key Hakka development area in Yunlin. Lunbei Township is also an important dairy farming region in Taiwan, and its main agricultural specialty, the muskmelon, has become world famous.

達德能源新源專案即坐落雲林崙背鄉，2023 年完成 6 座台灣體積最大的風機建置，該風場運轉一年所發的電量可供崙背鄉約 1.5 年的家戶用電。風機綠能的引進對地方來說有諸多幫助，運送風機機組對於道路及障礙物排除的要求很高，因此在建置過程中亦適時協助鄉里間的道路進行加強與修繕，並將電桿、電線地下化，增強用電安全性與友善景觀。

Wpd's Hsinyuan project is located in Lunbei Township, Yunlin. The construction of 6 largest wind

turbines in Taiwan was completed in 2023, and the electricity generated from the wind project in one year of operation will be able to supply electricity to the households in Lunbei Township for about 1.5 years. The introduction of wind turbine green energy is immensely beneficial for the local community in many ways. Transporting wind turbine units requires stringent road and obstacle clearance. Therefore, during the construction process, it is crucial to assist in strengthening and repairing local roads properly. Additionally, it involves the underground placement of electricity poles and cables to make it safer for electricity consumption and create a more landscape-friendly environment.

在生態方面，也會將生態調查結果完整記錄、持續追蹤需補強的議題，並請益在地生態環保團體。除此之外，也期望透過推廣風機旅遊帶動地方經濟發展，透過綠能守護至愛的土地，是達德對在地的承諾。

In terms of the environment preservation, wpd also fully records the ecological survey results, continues to follow up on issues that need to be remedied, and seeks advice from local environmental groups. Furthermore, it is hoped that by promoting wind turbine tourism, local economic development can be stimulated. As part of wpd's commitment to the community, this initiative aims to safeguard and preserve the beloved land with green energy.

「民之所欲常在我心」崙背鄉長李泓儀表示，瞭解鄉親的需求一直是責任與義務，抱持著熱愛崙背鄉這塊土地的心，積極勘查地方建設現狀與建設需

求，讓鄉親能夠在崙背鄉感受到軟硬體建設的成長，秉持「簡政便民」、「宜居樂活」、「產經新創」精神共創幸福活力旺的崙背鄉，任內積極推廣詔安客家文化輔導水汴頭崇賢寺申請登錄無形文化資產以及農曆元月十五日正式成為「雲林詔安日」。

"With the People Always in My Mind" Hong-Yi Li said, understanding the needs of his people has always been his responsibility and obligation. Holding the love for the land of Lunbei Township, he actively investigates the current state of local construction and demands for further construction, ensuring that the residents experience the growth in both software and hardware development in Lunbei Township, and adhering to the spirit of "simplified administrative procedures for the public", "livable and enjoyable living " and "innovative industry and economy", to create a happy and dynamic Lunbei Township. During his term of office, Mayor Li actively promoted the Zhao'an Hakka culture, assisted Shu Bian Tou Chongxian Temple in applying for registration as an intangible cultural heritage, and made the 15th day of the first lunar month the official "Yunlin Hakka Day".

李泓儀鄉長以其深切的關懷，將服務鄉親的使命感作溫暖人心的實際行動，深知農民所需，積極協助推動農民紓困措施，為他們減輕了經濟壓力，同時開辦鄉民身故慰問金，展現出他對鄉親們的無微不至的關心，這些舉措不僅暖化了人心，更是他一直堅守的苦民所苦的宗旨。

With his deep care, Mayor of Township Hong-Yi Li has turned his mission for serving the townspeople into practical actions that warm people's hearts. Deeply aware of the needs of farmers, he has been active in promoting relief measures for farmers to relieve their economic burdens, and at the same time offering condolences money for bereaved families, all demonstrate his meticulous care for the local residents. These measures not only warm the hearts of the people but has also been his steadfast commitment to alleviating the hardships of the community.

從深入了解鄉親的需求開始，李泓儀鄉長成功爭取了 3400 萬的資金，用於建設客庄特色風雨球場，成為鄉民休閒娛樂的理想場所外，更積極爭取 2400 萬的資金，打造友善無礙的人本環境行政中心，以及去年完工的多功能圖書館，為鄉民們提供舒適的閱讀環境，成為崙背的知識文化中心新地標。

Beginning with an in-depth understanding of people's needs, Mayor of Township Hong-Yi Li has successfully acquired \$34 million for the construction of the covered basketball court with Hakka village's features, which has become an ideal venue for the townspeople's leisure and entertainment. Mayor Li has also proactively acquired \$24 million for the construction of the administration center which is friendly, accessible and people-centered. The multi-purpose library which was completed last year also provides the community with comfortable reading environment and has become a new landmark as the knowledge and culture center in Lunbei.

除此之外，在崙背鄉都市公園中推動無障礙環境改善工程以及校園安全耐震補強環境改善工程。在面對高齡化社會的挑戰時，提供完善的長照服務環境，並成功爭取 1800 萬的資金用於改善活動中心、集會所及長青食堂。

Moreover, he has promoted an accessible environment in Lunbei Township metropolitan park and the safety and seismic reinforcement improvement project at campus. In response to the challenges of an aging society, he is committed to providing a comprehensive environment for long-term care services and has succeeded in acquiring NT\$18 million of funds to improve the activity center, assembly hall, and the Senior Cafeteria.

同時，他也在爭取逾 1700 萬的資金，用於新建草湖集會所和崙前社區活動中心，為社區居民營造更多的交流場所。李泓儀鄉長的付出和關愛無疑在崙背鄉播下了幸福的種子，將在未來繼續綻放出希望的花朵，而鄉長李泓儀也邀請全國鄉親蒞臨可愛的鄉村體驗崙背風機旅遊。

Meanwhile, he is also striving for over NT\$17 million of funds for the construction of new Caohu Assembly Hall and the Lunqian Community Activity Center, to create more communication venues for the community residents. The dedication and care of Mayor of Township Li Hong-Yi has undoubtedly planted the seeds of happiness in Lunbei Township and will continue to blossom with hope in the future. Mayor Li extends an invitation to people from all over the country to visit and experience the delightful countryside atmosphere of Lunbei through wind turbine tourism.



崙背富有鮮乳之鄉美譽

吉利兒農牧場

Lunbei: the home of fresh milk. – Jilier Dairy Farm

吉利兒畜牧場的場主林義和從父親手上接下牧場並延續崙背鄉特有的傳統產業，對牧場來說，小牛的照顧和培育健康的體質很重要，培育良好的體質才能泌出優質乳汁，無論是生產小牛與產乳量更能表現出色。對畜牧零經驗的太太憑藉細心觀察和獸醫的協助，把每隻小牛都當成孩子，透過眼神和互動感受牠們的健康和情緒。

Yi-Ho Lin, the owner of Jilier Dairy Farm, inherited the dairy farm from his father and continued the unique traditional industry in Lunbei Township. For the dairy farm, the nurturing and development of young calves hold paramount importance, as fostering a healthy physique is essential for producing high-quality milk. No matter it's the birth of calves or milk production, a robust physique is crucial for outstanding results. His wife, though with zero experience in animal husbandry, treats each calf like her own child with careful observation and the help of a veterinarian, and senses the calves' health and emotions through eye contacts and interactions.

崙背酪農產業歷史悠久，現今的畜牧技術比以前進步很多，吉利兒牧場導入營養師計算飼養營養及獸醫師每日巡場健檢，提高牛隻體質和乳品質。與食品公司義美合作，每天收乳，均進行生乳採樣針對蛋白質、脂肪量、體細胞、生菌數 及風味進行嚴謹檢驗，合格後才能進入鮮乳製程。

With a long history of Lunbei dairy farming, today's animal husbandry technology is much more advanced than in the past. Jilier Dairy Farm introduces nutritionists to calculate the feeding regimen and had veterinarians to perform routine on-site health

examinations, resulting in improved cow physique and milk quality. After cooperating with I-MEI Foods Co., Ltd., the farm collects milk twice a day, and stringent tests are conducted on raw milk by accessing various factors like protein, fat content, cell counts, density, and flavor. Raw milk can only proceed to the fresh milk production process after passing the test.

吉利兒牧場飼養 200 多頭乳牛，每日供應新鮮牛乳，林義和每天從清晨忙碌到晚上，平均睡 7 個多小時，相當辛苦。林太太表示，他們為牛隻提供戶外場地讓牛隻曬太陽跑跳，並放音樂讓牛保持好心情，在友善飼養環境和細心照顧下，乳牛回饋高品質的乳品和產量，讓牠們成為快樂牛，也讓他們成為快樂的牧牛人。

Jilier Dairy Farm is home to more than 200 dairy cows and supplies fresh milk every day. Yi-He Lin works hard from early morning to late at night every day, with an average of only 5 hours of sleep. Mrs. Lin explained that they offer regular outdoor areas for the cows to enjoy the sun. They also play music to keep the cows in good spirits. With a friendly environment and meticulous care, the cows give back high-quality milk and production. This makes them happy cows and, in turn, Mr. Lin and his wife are happy dairy farmers.

在地酪農區為特色，打造休閒農場

千巧谷牛樂園

Establishing a recreational farm with the unique attributes of the local dairy farming area – Chan Chau Ku Happy Moo Ranch

2003 年夏天，千巧谷成立於農牧業富饒的崙背鄉，迄今已在雲林深耕近 20 年，佇立在鄉間都市歐風烘焙坊，在當時是崙背鄉唯一有冷氣吹的麵包店，精緻的門面與傳統街道產生距離感，常有戴斗笠的、穿

▲ 千巧谷乳酪蛋糕（圖片來源：千巧谷提供）
Chan Chau Ku's cheesecake (Image source: Chanchauku)

雨鞋或滿腳泥濘的鄉親站在門外猶豫，服務人員積極熱情打招呼，逐漸打破與居民間的一道牆，千巧谷盡全力了解鄉親的需求，供應農民們需要的台式點心麵包，這份溫暖幸福的味道慢慢的在鄉間田園傳開。

In the summer of 2003, Chan Chau Ku was established in the agriculturally rich Lunbei Township and has been deeply rooted in Yunlin for nearly 20 years. The European-style bakery, standing in the countryside, was the only air-conditioned bakery in Lunbei Township at that time, and the exquisite facade created a sense of distance from the traditional streets. There are often people wearing bamboo hats, rainboots, or with muddy feet standing outside and hesitating, until they were greeted by the bakery staffs, gradually breaking down the barrier between the bakery and the community. Chan Chau Ku made it the priority to understand the locals' need and supply the Taiwanese-style snack and bread for farmers. This warm and happiness taste gradually spread throughout the countryside.

崙背是酪農專業飼養區，牛產的乳源品質是全國頂尖數一數二，千巧谷用了最好的原料，不經成分調整，研發出頂級的乳酪蛋糕等多種鮮奶伴手禮，樣樣口感綿密，比市售鮮奶濃醇，推出後獲得鄉親顧客的廣大迴響；除了鮮奶更融合創意與在地元素的特色伴手禮，如布袋戲為主軸設計的鳳梨酥禮盒；臺灣詔安客家文化的開口獅花生餅，吃完後的外盒可以依照步驟 DIY 成舞獅頭；斗笠外型花生酥，吃完還可以 DIY 變成斗笠等等，都是結合崙背在地文化創意，讓遊客帶著在崙背的回憶與在地文化的體驗離開。

Lunbei is a professional dairy farming region. The quality of milk produced is one of the tops in Taiwan. Chan Chau Ku uses the best raw materials without

▲ 熱門打卡點彩繪屋（圖片來源：千巧谷提供）
The painted house, a popular check-in spot at Chanchauku (Image source: Chanchauku)

any alterations to develop the best cheesecakes and other gifts made with fresh milk, and all of which taste smooth and thicker than the milk available on the market. These gifts have been widely welcomed by local customers. In addition to fresh milk, there are special gift items combining creativity and local elements. The pineapple cakes are designed with a focus on traditional Taiwanese puppetry (Budaixi); Lion dance-themed Kai Kou Shih peanut cookies represent the Zhao'an Hakka culture of Taiwan, and the box can even be DIY transformed into a head of a dance lion; the bamboo hat styled peanut cakes with the box being DIY transformed into a bamboo hat. These souvenirs combine the creative and cultural essence of Lunbei, leaving visitors with lasting memories and local cultural experiences.

老闆黃吉雄買下 1.2 公頃荒廢多年的紡織廠，把舊建築打造成兼具觀光休閒的牧場。2016 年「千巧谷牛樂園牧場正式開幕」起先是以牧場結合麵包店經營方式，提供客人好的購物環境，園內飼養乳牛外，還有台灣水牛，讓民眾零距離與牛接觸，體驗餵牛吃牧草的樂趣，還能餵魚、玩沙池，免費入園、免費停車的服務成為崙背鄉遊客必訪熱點，展售各種麵包、蛋糕及奶酪產品也是雲林特色伴手禮首選。

The owner Ji-Xiong Huang purchased a 1.2-hectare long-abandoned textile factory and turned the old building into a tourist and recreational ranch. In 2016, the "Chan Chau Ku Happy Moo Ranch" was officially opened. It was first operated as a ranch combined with a bakery to provide customers with good shopping experiences. The ranch breeds dairy cows as well as Taiwan's native water buffalos, allowing people to have close encounters with these animals and experience the joy of feeding them with fresh

pasture grass. Visitors could also enjoy activities like feeding the fish and playing in the sandbox. With free admission and free parking, the ranch has become a must-visit spot for Lunbei Township tourists. Various kinds of bread, cakes, and cheese products on display for sale are also the top choices for Yunlin's specialty souvenirs.

專業溫室直立式栽培網紋洋香瓜

Tilling Green 台霖農場

Professional Greenhouse Vertical Cultivation of Net Pattern Muskmelon - Tilling Green

台霖農場青農林宜賢，大學就讀生化科技系卻返鄉務農。他在學時有機會參與植物品種鑑定和寫論文，發現農業很平易近人，由於從小在農村長大，他深信勤勞會有成就。他是家中唯一務農的孩子，父母原本擔憂農業收入不穩定，但經過多年努力呈現成果後逐漸獲得接受。

Yi-Xian Lin, a young farmer of Tilling Green, studied Biochemical Science and Technology at university, but returned to his hometown to work as a farmer. When he was a student, he had the opportunity to participate in plant species identification and write thesis, and realized agriculture is very approachable. Since he grew up in a rural area, he was convinced that hard work would lead to success. He is the only child in his family to work in agriculture. His parents were worried about instability of income from farming, but after years of hard work, he gradually gained acceptance for his work and the fruits of his efforts.

崙背鄉主要種植洋香瓜，但受戶外種植氣候影響波動大，台霖農場使用溫室栽培，讓洋香瓜避免受氣候影響，並分批生產，既分散勞動力也能更專心照顧每株瓜果，維持優質產量，更外銷日本、新加坡等國為崙背洋香瓜打出另一片天。

Muskmelons are the main crop in Lunbei Township, but the outdoor cultivation was heavily affected by the weather condition, so Tilling Green uses greenhouse cultivation to avoid the effects of weather on muskmelons and produces them in batches, which not only disperses workforce, but also allows for more concentration on taking care of each muskmelon to maintain quality production. The melons are even exported to Japan, Singapore, and other countries, opening a new horizon for Lunbei's muskmelons.

台霖農場利用感測器即時監控環境數據，當不利於植物生長時，進行營養或水分補給、遮陽、通風等，營造良好生長環境，提高品質。林宜賢希望能改變崙背鄉人口老化和青年外流問題，吸引在地青年參與種植洋香瓜，延續發展並傳承農特產。

Tilling Green utilizes sensors to monitor environmental data in real time. When the environment is not favorable for plant growth, nutrient or water supplement, shading, and ventilation will be provided to create a sound growing environment and improve quality. Mr. Lin hopes to change the problems of aging population and youth outmigration in Lunbei Township, attract local youths to participate in the cultivation of muskmelons, and sustain the development and inheritance of agricultural specialties.

吉利兒牧場

Jilier Dairy Farm



0953-966-106

千巧谷

Chanchauku



05-6969-845

台霖農場

Tilling Green



0972-353-256

t-farmmuskmelon@hotmail.com

黑人 溫室農場



0937-034-461

0939-812-919

雲林廖家 鮮採水果專賣



0961-261-669

發行人 Publisher | 曾葳葳 Weiwei Tseng

總編輯 Editor in Chief | 李雅貞 Alison Lee

執行主編 Managing Editor | 馬羽安 Ann Ma

特別感謝 Special Thanks

千巧谷牛樂園 Chan Chau Ku Happy Moo Ranch | 崙背鄉鄉長李泓儀 Hong-Yi Li, Mayor of Lunbei Township | 吉利兒農場 Jilier Dairy Farm | 崙背鄉公所 Lunbei Township Office | 台霖農場 Tilling Green (依字母順序排列 List in alphabetical order)



