

缺水 不缺解方

文／顏廷恩 · 圖／續水團隊提供、秘書處

By / Ting En Yen ·

Image courtesy of / ContiHydro and Secretariat

CONTIHYDRO

A SOLUTION FOR A WATER-SECURE FUTURE

台灣的雨水都去哪裡了？

台灣的年均降雨量高於世界許多地區，卻仍時常面臨缺水危機。河川短促、地勢陡峭，讓大量雨水迅速流入大海，再加上水庫淤積、降雨分布不均，豐水期存不住水，枯水期又供應不足。

2021 年的百年大旱，更是將問題推向極限。當時，農業灌溉受影響，民生用水吃緊，連仰賴超純水的半導體產業也面臨減產風險，影響全球供應鏈。政府緊急動用分區供水、跨區調度、海水淡化與再生

Where does Taiwan's rainwater go?

Taiwan receives significantly more rainfall than many regions worldwide, yet water shortages remain a persistent issue. The island's steep terrain and short rivers cause rainwater to drain rapidly into the ocean. Additionally, reservoir sedimentation and uneven rainfall distribution make it difficult to store water during the wet season, leading to shortages in drier periods.

The severe drought in 2021 highlighted Taiwan's water crisis. Agricultural irrigation was disrupted, household water supplies were severely strained, and semiconductor manufacturing, which is heavily reliant on ultra-pure water, faced production risks, affecting the global supply chain. In response, the government

水，雖然暫時紓解缺水壓力，但面對氣候變遷，台灣水資源管理更面臨嚴峻挑戰。

當水源短缺時，農業、民生與科技產業只能競爭有限的水資源，但如果創造新水源不易，是否有更聰明的方式來管理現有水資源？帶著這樣的疑問，一群學生決定不只是關心，而是親自動手找解方。他們鎖定科技產業的用水模式，思考如何透過創新策略提升水資源利用效率。他們相信，透過更靈活的管理方式，產業發展與水資源永續不必是對立的選擇，而是能夠共存的未來。

水權轉換，永續用水新解方

「續水 – 我們賣永續的水」，團隊由百川學程電機工程核心陳佳萱同學，百川學程分子醫學核心楊秉寰同學，與國立高雄師範大學電子工程學系李品澤同學共同組成。

續水團隊針對台灣科技業的高耗水問題，提出創新的水資源管理方案，另外在 2023 未來創業人計畫 Young Entrepreneur of the Future (YEF)、陽明交大創新創業競賽與清華創業日決賽皆獲得首獎的殊榮。

核心理念是「水權轉換」，透過雨水收集與調配，提高水資源的利用效率。續水團隊的做法是在 A 點（如露營地或社區）使用儲水裝置蓄存雨水，供應當地使用，減少對水庫的依賴，進而讓原本供應給 A 點的水量能夠重新調配，提供給高耗水的半導體產業。

儲水裝置就像一組放大版的樂高積木，可以自由拼接、靈活擴展，根據需求組成 8 格、16 格，甚至更大規模的儲水系統。它的結構由方格狀支架搭建，外層覆蓋防水布與透水布，可有效蓄水，同時進行初步過濾，確保水質。安裝方

implemented emergency measures, including regional water rationing, inter-regional water transfers, desalination, and water recycling initiatives. While these efforts provided temporary relief, Taiwan's long-term water management continues to face mounting challenges due to climate change.

When water becomes scarce, agriculture, households, and the tech industry are forced to compete for limited resources. If creating new water sources is challenging, then the focus should shift to managing existing supplies more efficiently. With this in mind, a group of students decided to take action. Instead of just raising awareness, they examined the tech industry's water usage and explored innovative ways to improve efficiency. They believe that with smarter management, economic growth and sustainable water use don't have to be in conflict; they can go hand in hand.

A new approach to sustainable water management

ContiHydro was founded by Chia-Hsuan Chen from the Electrical and Computer Engineering Core Professional Course of the Arete Honors Program, Ping-Huan Yang from the Molecular Medicine and Bioengineering Core Professional Course of the Arete Honors Program, and Pin-Ze Lee from the Department of Electronic Engineering at National Kaohsiung Normal University.

ContiHydro developed an innovative water management solution to address the high water consumption of Taiwan's tech industry. Their efforts earned them first place in the 2023 Young Entrepreneur of the Future (YEF) program, the NYCU Innovation and Entrepreneurship Competition, and the NTHU Entrepreneur Days.

At the heart of their solution is Water Rights Transfer, a strategy designed to enhance water efficiency by reallocating resources. Their approach involves installing rainwater collection systems in campgrounds and residential communities, enabling them to rely on locally collected rainwater. This, in turn, frees up previously allocated water, making it available for water-intensive industries like semiconductor manufacturing, resulting in a more efficient and sustainable distribution of resources.

The rainwater collection system functions like an oversized set of interlocking blocks, allowing for flexible assembly and expansion. It can be configured into an 8-unit, 16-unit, or even larger system, depending on specific needs. Its structure consists of a grid-like frame covered with waterproof and



ContiHydro
續水 – 我們賣永續的水

ContiHydro team members
Pin-Ze Lee (left)
Chia-Hsuan Chen (center)
Ping-Huan Yang (right)

續水團隊成員
李品澤 (左)
陳佳萱 (中)
楊秉寰 (右)

式也簡單，先把方格堆疊好，固定結構後鋪上防水層，雨水一旦流入，就能牢牢鎖住，不會四處滲漏。

需要用水時，直接接上 USB 供電的小型泵浦就可抽水。這款裝置已在大安森林公園試驗過，結構穩固，人員與機具也能在其上行走。這種設計能提升整體用水效率，同時減少對地下水的抽取，實現更永續的水資源運用。

目前，團隊已經訪談超過百家露營場地與社區發展協會，並獲得合作意願，同時透過數據分析模擬台灣各地的降雨狀況，團隊也在校內綜合一館與工程五館之間的草地建立場域測試的儲水裝置，進行實地測試，希望將這套商業模式推廣應用，為台灣水資源管理帶來新的解方。

permeable layers, ensuring effective water retention while also providing initial filtration to maintain quality. Installation is straightforward: once the units are stacked and secured, a waterproof layer is added to prevent leakage and ensure proper containment of the collected rainwater.

When water is needed, a small USB-powered pump can be used to extract it. The system has been tested at Daan Forest Park, demonstrating its structural stability and ability to support both people and equipment. By improving water efficiency and reducing reliance on groundwater, it offers a more sustainable approach to water resource management.

ContiHydro has interviewed over a hundred campground operators and community development associations, securing collaboration opportunities. Additionally, the team has analyzed rainfall data from various regions across Taiwan to refine their approach. A pilot installation has been set up on campus, between Assembly Building 1 and Engineering Building 5, for real-world testing. The goal is to scale this model and introduce a new solution for water resource management in Taiwan.



The black device shown in the photo is the water collection system, now installed beneath the lawn between Assembly Building 1 and Engineering Building 5 for testing.

儲水裝置為照片中的黑色裝置，現已安裝在綜合一館與工程五館之間的草地下進行測試

畫藍圖容易，落地不容易

在創立這個項目的過程中，續水團隊並非只停留在構想階段，而是親身經歷各種挑戰，克服難題，才讓計畫真正落地實踐。「一開始在討論時，規劃得超完美，什麼時候做什麼，Timeline 都畫好了！」品澤回憶道，「但真的要建置水庫的時候，就剩我們三位成員…」當要實際施工時，難度瞬間攀升。最棘手的是場地丈量，專業工程團隊報價太高，學生團隊預算根本負擔不起，最後品澤直接自學上陣，從高雄特地趕來，拿著露營釘子、捲尺自己放樣，「這塊地我們就這樣圈起來了！」

「我們的預算相當有限……」佳萱苦笑。團隊的經費主要來自過去競賽的獎金，資源不多，



但仍需要購買模組化儲水裝置。當廠商報價出來時，大家都感到壓力不小，於是決定採取策略性的談判方式。品澤負責從技術與成本角度提出各種疑問，詳細詢問報價的細節，而佳萱則在旁協調，確保溝通順暢：「不好意思，我們只是希望更了解價格的組成……」經過多輪討論，廠商最終調整報價，讓團隊成功降低 46% 的成本，獲得更合適的價格。

當續水團隊首次介紹「水權轉換」概念時，經常被質疑：「這不就是水庫嗎？」「台灣不是已經在做了？」然而，當他們闡述完整個策略後，原本懷疑的人往往開始點頭：「這其實很聰明！」

「台灣的年均降雨量是全球的 2.5 倍，但 60% 的雨水流入大海，22% 蒸發，能存下來的少之又少。」佳萱解釋。而目前的解方也有極限，再生水回收率已達 95%，提升空間有限；海水淡化則成本高昂，每處理 1 噸水約需 2~4 度電，並非最佳選擇。

Planning is simple, making it work is not

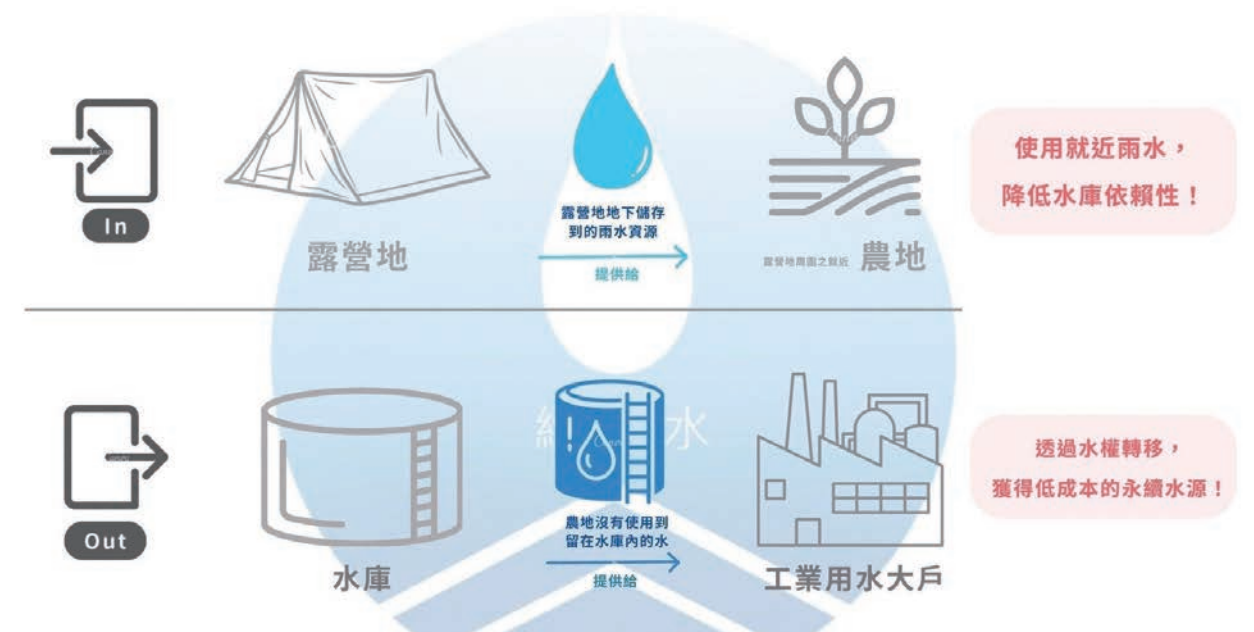
Turning an idea into reality is never straightforward. Throughout the development of this project, ContiHydro faced numerous challenges, continuously refining their approach to bring their vision to life.

"At the beginning, everything looked perfect on paper. We had a detailed timeline with every step mapped out," Pin-Ze recalled. "But when the time came to set up the water collection system, only the three of us were left."

Challenges mounted, especially during site surveying. Since hiring professional surveyors was beyond their budget, Pin-Ze took matters into his own hands. He traveled from Kaohsiung, armed with camping stakes and a measuring tape, and personally marked the land. "This is how we marked our project site!"

"Our budget was incredibly tight..." Chia-Hsuan admitted with a wry smile. Most of their funding came from prize money from previous competitions, which fell far short of covering all expenses. One of the biggest financial hurdles was purchasing the rainwater collection system. When they received the initial price quote from suppliers, the figures were shockingly high.

ContiHydro's solution flowchart. 解方流程圖



「所以我們的策略不同，不建水庫、不投入大錢，而是重新分配水資源。」秉寰說道。「像露營地、社區本來用水量低，讓他們收集雨水自用，就能把省下的水轉供科技產業。」

這套模式不需新管線、無須大規模投資，僅透過水權協商，就能讓水流向最需要的地方。當團隊清楚說明後，許多專家與企業代表開始認同：「這確實更有效率！」創新，有時不一定來自新技術，而是來自換個角度思考舊問題，這正是「水權轉換」的價值所在。

續水團隊的前進力量

續水團隊的核心精神來自於他們獨特的隊名「嘿疲 YOLO 乳」。這個有趣的名稱蘊含著團隊的態度，雖然過程辛苦，仍然享受其中的樂趣，帶著快樂與熱情迎接挑戰。他們相信，即使再累，這趟旅程依然值得。團隊運作上沒有傳統的階層分工，而是根據每個人的時間與能力，自主承擔任務，確保每項工作都能順利推進。這種靈活的合作模式讓成員能夠全心投入，彼此扶持，遇到困難時一起想辦法，讓專案在挑戰與歡笑中持續向前。

Determined to find a solution, they adopted a tactical negotiation strategy. Pin-Ze took the lead in questioning the technical and cost aspects, analyzing every detail of the pricing, while Chia-Hsuan facilitated the discussion to ensure smooth communication. "We're just trying to understand the cost breakdown better," she would interject when needed. After multiple rounds of discussions, the supplier adjusted the price, ultimately reducing their costs by 46%—a significant breakthrough for the team.

When ContiHydro first introduced the concept of Water Rights Transfer, they often encountered skepticism. "Isn't this just another reservoir?" some would ask. "Isn't Taiwan already implementing similar solutions?" However, as the team outlined their strategy in detail, initial reservations were soon replaced by recognition of its potential. A common reaction was, "This actually makes a lot of sense!"

"Taiwan receives 2.5 times the global average annual rainfall, yet 60% of it flows directly into the ocean, and another 22% evaporates, leaving very little for actual use," Chia-Hsuan explained. Existing solutions have nearly reached their limits. Reclaimed water is already being recycled at 95% efficiency, meaning there is little room for further improvement. Meanwhile, seawater desalination remains costly, as it requires 2 to 4 kWh of electricity per ton of water.

"Our approach is different," Ping-Huan explained. "Rather than building reservoirs or making costly infrastructure investments, we focus on reallocating water resources. Campgrounds and residential communities consume relatively small amounts of water. Equipping them with rainwater collection systems enables self-sufficiency, freeing up water for high-demand industries like semiconductor manufacturing."

傳承與未來展望

續水的成長離不開許多貴人的支持，從學界到產業，他們一路提供指導與資源。來自陽明交大 Global MBA 的楊志偉助理教授、副總務長楊黎熙、技正葉武宗與技正蔡昇哲，幫助團隊落地測試並推動儲水裝置建置；中部科學園區副局長施文芳，與台灣自來水公司總經理李丁來則為團隊提供水權轉換的關鍵建議；時代基金會與業師詹千慧透過創業人才孵育計畫——未來創業人（YEF）協助團隊釐清策略方向。正因有這些人的幫助，續水才能從概念走向現實，真正影響產業與社會。

隨著團隊成員即將畢業，續水專案未來將由其他團隊接手，團隊成員則提供技術與資源，期待這項計畫能在更多場域實現。對團隊來說，

This model eliminates the need for extensive pipeline construction or large-scale investment. Negotiating water rights agreements ensures resources flow to where they are needed most. When the team clearly articulated this idea, many experts and industry leaders acknowledged its potential. Innovation is not always about new technology; it often comes from rethinking existing problems. That is the essence of Water Rights Transfer.

The strength of ContiHydro's teamwork

ContiHydro embodies the essence of its unique name—"Hei Pi YOLO Ru", reflecting their spirit of perseverance, teamwork, and finding joy in the journey. No matter how exhausting the process becomes, they tackle challenges with enthusiasm, believing that the experience itself makes it all worthwhile. The team values flexibility over a rigid hierarchy, assigning tasks based on each member's skills and availability. This approach helps maintain both efficiency and engagement. When faced with challenges, they work together to find solutions, support one another, and drive the project forward with collective determination and a strong sense of teamwork.

Passing the torch

The growth of ContiHydro has been shaped by the invaluable support of mentors and experts from both academia and industry. Faculty and staff members at NYCU, including Assistant Professor Brian Yang from the Global MBA program, Associate Dean of General Affairs Li-Hsi Yang,

To the team, ContiHydro is like a seed, poised to grow into a solution with lasting impact as water policies evolve and public awareness increases.

在團隊眼中，續水是一顆種子，等待水資源政策與社會關注度提升後，發展出更具影響力的解決方案



續水的核心價值不在於品牌，而是這套方法能否真正改變台灣的水資源管理方式。「我們已經建立了一套完整的方法論，包括水權轉換的流程、法規考量與交換模式，未來即使不是我們執行，這套模式依然可以被複製、優化與落地。」品澤表示。

秉寰認為，「或許未來大家不會記得續水這個名字，但如果水權轉換成為被廣泛接受的解方，那我們的目標就已經達成了。」佳萱則希望，續水能讓大家理解未雨綢繆的重要性，當下次乾旱來臨時，台灣能有更完善的水資源管理機制，而不再陷入水荒危機。在團隊眼中，續水是一顆種子，等待水資源政策與社會關注度提升後，發展出更具影響力的解決方案。



and Technical Specialists Wu-Tzung Ye and Sheng-Che Tsai, played a crucial role in facilitating field tests and assisting with the installation of the rainwater collection system. In the industrial sector, Deputy Director-General Wen-Fang Shih of the Central Taiwan Science Park and President Tin-Lai Lee of Taiwan Water Corporation provided key insights into water rights transfer. The team also received strategic guidance from Jessie Chan and the Epoch School through the Future Entrepreneur (YEF) program, which helped them refine their business approach. With this collective support, what began as a concept has evolved into a tangible solution with the potential to impact industries and society.

As the founding members prepare to graduate, they will pass the project to a new team, providing technical expertise and resources to ensure a smooth transition. The ultimate goal is for this initiative to take root in more locations. For the team, ContiHydro is not about building a brand—it is about creating a sustainable model that can transform water resource management in Taiwan. “We have developed a complete framework that covers the water rights transfer process, regulatory considerations, and exchange mechanisms. Even if we are no longer leading the project, this model can still be replicated, refined, and implemented,” Pin-Ze shared.

Ping-Huan envisions a future where people may not remember the name ContiHydro, but if water rights transfer becomes a widely accepted solution, their mission will be fulfilled. Chia-Hsuan hopes their efforts highlight the importance of proactive planning, ensuring that when the next drought occurs, Taiwan will have a well-structured water management system in place rather than scrambling to contain another crisis. To the team, ContiHydro is like a seed, poised to grow into a solution with lasting impact as water policies evolve and public awareness increases.



ContiHydro Team Members
續水 - 我們賣永續的水團隊成員



第一代

- 陳佳萱 國立陽明交通大學
- 李品澤 國立高雄師範大學
- 陳雅文 天主教輔仁大學
- 張育華 國立台灣師範大學
- 許月秋 國立暨南國際大學
- 廖淨彤 天主教輔仁大學
- 莊蕙如 國立政治大學

第二代

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- 張育華 國立台灣師範大學
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第四代

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- 楊秉寰 國立陽明交通大學

第三代

- 陳佳萱 國立陽明交通大學
- 李品澤 國立高雄師範大學
- 楊秉寰 國立陽明交通大學
- 蔡沛艾 國立清華大學
- 李欣璇 國立政治大學

