

7 AFFORDABLE AND  
CLEAN ENERGY



SUSTAINABILITY REPORT  
TAMKANG UNIVERSITY

2020  
AFFORDABLE &  
CLEAN ENERGY





# AFFORDABLE AND CLEAN ENERGY

## Measures towards affordable and clean energy

TKU meets the detailed indicators from 7.2.1 to 7.2.5, except for 7.2.6 because the university has not set up a fund for reinvestment. The following is a brief description of the introduction of international standards, the implementation of the plan, and the affirmation of energy-saving performance:

1. Introduction of international standards: Since the implementation of the ISO14001 environmental management standard in 2003, TKU has always adhered to the concept of "energy-saving and carbon reduction," and gradually implemented various energy-saving measures under governmental regulations, such as the construction of an energy-saving monitoring system on the Tamsui campus in 2006 and 2013. According to the ISO14064-1 standard for campus greenhouse gas emission verification, the introduction and passing of the ISO50001 energy management standard in 2015 have not only effectively reduced the university's electricity consumption, but also achieved the goal of at least 1% of the annual energy-saving rate of Tamsui campus in the past 6 years; the university saves a lot of money, and the electric-

ity bill will be reduced from the highest peak of NT\$91.26 million per year to NT\$66.28 million per year in 2020.

2. Project implementation management test: In addition to assisting implementation through ISO international standards, TKU organized the establishment of the "Environmental Sustainability Promotion Committee," with the Vice President for Administrative Affairs as the chairman, responsible for supervising and reviewing the implementation of various energy-saving plans effectiveness, all three campuses must propose the implementation of new energy-saving plans every academic year.
3. Affirmative energy-saving performance: From 2011 to 2013, TKU was awarded the "Environmental Protection Award" of Taiwan for three consecutive years. In 2017, TKU won the "Energy-saving Benchmark Award" of the Ministry of Economic Affairs of the Executive Yuan. In 2019, the newly completed Tamsui campus Hsu Shou-Chlien International Conference Center received the Green Building Silver Award, which represents the government's recognition of the university's high efficiency in energy usage.

## **Energy-efficient renovation and building**

Green building refers to the building with a life cycle (processes from building materials production to building planning, design, construction, use, management, and demolition) which consumes the least earth resources, uses the least energy, and produces the least waste. Green buildings are ecological, energy-saving, waste-reducing, and

healthy buildings. The nine major indicators include ecological diversity indicators, green-ing capacity indicators, base water retention indicators, daily energy-saving indicators, carbon dioxide reduction indicators, waste reduction indicators, indoor environment indicators, water resources indicators, and sewage and waste improvement indicators. TKU actively follows the guidelines for the new (renovated) building of the nine major green building indicators: after the first phase of the construction of the Lanyang campus was approved by the Ministry of the Interior and issued the green building mark in September 2006, the Hsu Shou-Chlien International Conference Center building completed on Tamsui Campus in 2018 was also awarded the Green Building Silver Mark in May 2019.

## **Upgrade buildings to higher energy efficiency**

1. The Tamsui Campus draws up a budget for energy-saving improvement projects annually, and updates the old models of energy-consuming air-conditioning equipment to new-style high-efficiency air-conditioning equipment. Lighting equipment has also replaced traditional lamps with LED energy-saving lamps, and the campus energy monitoring and management system effectively monitor the operation of each piece of equipment. In 2020, the campus replaced the cold-water main engine of the library with a centrifugal energy-saving main engine at a cost of NT\$16.3 million.
2. The facade of the Department of Architecture is the first solar curtain wall made of glass on the campus in Taiwan. The walls and roofs of the second, third, and fourth floors are equipped with solar panels. The

obtained electricity may be used for the exhaust fans on each floor of the department building to keep the studio ventilated. Wind towers are also installed on the roof to reduce the indoor temperature in summer.

3. Solar photovoltaic panels are expected to be installed on the top floor of the gymnasium and swimming pool of Tamsui Campus. Introducing green energy power generation technology and effectively increase the roof insulation, to reduce the air conditioning load of the original sports venues.

## **Carbon reduction and emission reduction**

TKU attaches great importance to energy conservation and carbon reduction and first passed the ISO14064-1 greenhouse gas emission verification in 2013. The scope of verification includes Scope 1 and Scope 2: this defines the scope of direct and indirect emissions for emission sources within the boundaries defined by the university.

Scope 1 mainly directs from the greenhouse gas emissions, such as the use of gasoline in the university, etc.; Scope 2 covers indirect greenhouse gas emissions from energy sources, such as purchased electricity.

The greenhouse gas emissions of TKU are designated from Scope 2, that is, the purchased electricity that accounts for more than 92% of the total emissions. Therefore, energy-saving targets were set as an action plan to reduce carbon emissions, and then the ISO50001 energy management system was introduced to effectively reduce campus electricity consumption while reducing carbon dioxide emissions. In 2020, TKU's carbon

emissions were 13,208 metric tons, a 6.7% reduction from the previous year.

## **Plan to reduce consumption**

TKU hosts environmental sustainability promotion committee meeting annually to discuss energy-saving plans for the three campuses' upcoming academic year, and regularly supervises and reviews the implementation of each campus plan. In response to climate change and warming issues, in line with the Ministry of Economic Affairs' plan to promote government agencies and institutes to save electricity by 1% per year, during the 2021 academic year, the Tamsui campus aims to reduce the EUI value of the campus by 1%. It is estimated that the electricity consumption will be reduced by 234,000 kWh and the carbon will be reduced by 119,000 kilograms. The implementation strategy includes energy consumption management and control of buildings and halls to achieve equipment energy saving.

1. Renewing the air conditioner on the second floor of the College of Foreign Languages and Literatures.
2. Replacing the multi-connected inverter air conditioners on the 3rd and 4th floors of the Chung-Ling Chemistry Hall with new ones.
3. The second phase lighting improvement project of Chung-Ling Chemistry Hall.
4. The lighting improvement project of the Science Hall coordinated with the Office of General Affairs to guide each building to implement energy-saving management work, the administrator may accurately record the electricity consumption of each space and conduct electricity consumption



analysis. According to this analysis, counseling units with higher energy consumption on energy conservation management work, discussing and improving the electricity consumption of each space may be conducted.

## Energy wastage identification

TKU has introduced ISO50001 since 2015 to enable organizations to establish systems and processes to improve energy performance, including energy efficiency, use, and consumption. The systems are compatible with different organizational forms and energy use requirements, including performance monitoring and measurement, important management process documentation and performance reports, equipment design and procurement processes, etc., to show compliance with regulations and stakeholders' requirements. According to the requirements of the ISO50001 energy management system, TKU handles the energy audit work of each campus every year to grasp the energy-intensive units and space equipment, and further implement energy management. After five years of operation, it has mastered the bulk of campus electricity consumption (for example, the top 20 electricity users), and then adopted the 80/20 rule to focus on the above improvement op-

portunities as they need to establish energy baselines, energy performance indicators and other verification tools due to the system, internalized to each campus general affairs unit for continuous processing.

## Divestment policy

In 2020, the dependence on coal (or gas) power generation was greatly reduced after signing the contracted capacity with the Taiwan Power Company; the contracted capacity of Area A of the Tamsui Campus has been reduced from 4,999KW to 3,950KW, the capacity of Area B has been reduced from 3,100KW to 2,600KW, and the capacity of Lanyang Campus has also been reduced from 790KW to 600KW.

## Energy use density

- Energy consumption per sqm:  
93,416.4252/284,948=32.784%
- Total energy consumption (Gigajoules):  
93,416.4252
- Building area of university buildings (square meters): 284,948



## Energy and the community

TKU implements this indicator from 7.4.1 to 7.4.5. Looking at the detailed indicators, it can be divided into four categories: collaborations between universities, implementation of governmental plans, universities link together, and encouragement of development and innovation. The brief description is as follows:

1. Collaboration between universities: The university responded to and signed the "The Talloires Declaration," and in 2013, it initiated the formation of the "Taiwan Green University Alliance" with the National Taiwan Normal University and other colleges and universities, as a permanent member. The continuance to participate in discussions on various environmental and energy issues of the alliance, including green campus practices, setting green energy generation issues, and internalizing the United Nations SDGs goals; in addition, from 2019 to 2021, the President of the University will also serve as a supervisor of the alliance.
2. Implementation of governmental plans: Teaching faculties from several departments of TKU have contributed their talents in the energy field, including the Department of Architecture, Chemical and Materials Engineering, Water Resources and Environmental Engineering, Computer Sciences and Information Engineering, and Economics, etc., by serving as review members, implementing research projects, or be in charge of organ training, etc., and continue to cooperate with the industry, government, and academia to exert influence.

3. Universities link together: To implement the "globalization," TKU plays the role of the locomotive, leading the primary and secondary schools in Tamsui, Lanyang, and the Northern Coast area to develop together; especially at the end of 2019, in conjunction with seven elementary schools, local NGOs in Tamsui and Tamsui district offices, the "Ecological Sustainable Freshwater Declaration" was issued. The public and private sectors are gathered together to demonstrate the Tamsui district's determination to ecological conservation and environmental protection.
4. Encourage development and innovation: "Futurization" is one of the three educational concepts of TKU, and the most direct way to practice futurization is to uphold the spirit of PDCA and continue to develop and innovate to respond to changes in the world. All units within the university must not only upgrade and transform (track A) but also strive for innovation and transformation (track B). Outside the university, industry-academia cooperation projects support the development of low-carbon economy or technology start-ups; under the limited resources, TKU continues to strive for funding and support, foster new ventures that are in line with the green economy, and implement the mission of universities to take from society and contribute to society.

### Local community outreach for energy efficiency

TKU organizes relevant activities in the local community to raise awareness on the importance of energy efficiency and clean energy. The relevant instructions are as follows:

1. USR Project Related Activities: TKU and seven primary schools around Tamsui jointly organized the "School SDGs Environmental Sustainability Workshop," after conducting a consensus, three action plans are proposed for the government, institutes, and individuals:

(1) The government should replace thermal power generation with green energy for species protection and hillside maintenance;

(2) Institutes should implement environmental education and reduce resource consumption;

(3) Individuals should reduce the use of plastic products, land-based garbage, and various wastes, and take inventory of personal carbon footprints.

2. Related Projects: Teaching faculties from the Graduate Institute of China Studies implement the Teaching Practice Research Project of the Ministry of Education, invited teachers from Jinshan High School to conduct lectures on Jinshan nuclear waste disposal and local creation issues. Through the deep cultivation of Lin Mei and local international projects, I went to the three primary schools in Yilan Yutian, Sanmin, and Longtan. With the theme of environmental protection, through DIY production and games, students are taught the importance of environmental protection and classification.

3. Educational Promotion Activities: Each college promotes energy conservation and environmental safety and health cooperation matters to the faculty every semester. For instance, the Department of Mass Commu-

nication of the College of Liberal Arts coordinated the implementation of the university's energy and environmental safety and sanitation goals, the "TKU Video Art Workshop" photo development, amplify the chemicals used, and regularly recycle and manage them in accordance with regulations to reduce the impact on the environment.

## **100% renewable energy pledge**

TKU promotes the realization of the promise of 100% renewable energy through cooperation projects, research projects, and activities. The relevant actions are as follows:

1. Cooperation Projects: TKU actively cooperates with solar photovoltaic panel companies, giving priority to the installation of solar power generation systems on the Tamsui campus, and the construction will start in the summer of 2021.

2. Research Projects: teaching faculties from the Graduate Institute of China Studies invited the Secretary-General of Taiwan Geothermal Resources Development Association to conduct a lecture on geothermal and future energy in the 2020 Educational Practice Research Project of the Ministry of Education.

3. Relevant Activities: all colleges and departments put paper recycling bins and toner cartridge recycling bins in offices and conference rooms to implement the habit of recycling.

## **Energy efficiency services for industry**

TKU actively promotes energy efficiency and clean energy through energy efficiency assessments and holding related conferences. The relevant actions are as follows:

1. Energy Efficiency Evaluation: TKU's incubation center provides an evaluation of energy efficiency when entering a manufacturer to operate a business, and provides free proposal suggestions. For instance, the stationed manufacturer "Behemoth Green Technology Co., Ltd." has set up a demonstration field under the guidance of TKU's Champion Incubation Center to remove local waste bean dregs and sludge that cannot be processed. These sludges are provided to the company that raises black soldier flies for consumption. The black soldier flies not only decompose these wastes but these waste products may also be used as feed for livestock and plant fertilizer in agriculture; in terms of business, it can also be produced as a facial mask, which treats some of the pollution sources discarded by factories and provides value-added products.
2. Relevant Conferences: Teaching faculties from the Graduate Institute from China Studies held a seminar on "Taiwan's Effectiveness of Environmental Pollution Prevention and Control in Southeast Asia" to understand the effectiveness of environmental pollution prevention and control. Teaching faculties from the Graduate Institute of European Studies participated in the "Fourth Taiwan-EU Forum in 2019" and explained the Sustainable Europe Investment Plan, talking about the sustainable development of the European Union, the transition to clean energy, and the emission reduction measures for production and consumption.

## **Policy development for clean energy technology**

TKU provides information and support to the government in terms of clean energy and energy-saving technology policies. The relevant actions are as follows:

1. TKU as one of the founding and permanent members of the Taiwan Green University Alliance: In 2013, Taiwan's colleges and universities that care about environmental protection and sustainable development jointly propose the establishment of the "Green University Union of Taiwan," TKU is one of the founding members and permanent member institute, served as the supervisory university from 2019 to 2021, and continues to exert influence on the issues of energy conservation and carbon reduction in colleges and universities and the implementation of SDGs.
2. Cooperate with the New Taipei City Government to promote the Green Elf Project: A teaching faculty from the Department of Architecture serves as a lecturer on energy conservation and carbon reduction in public service agencies of the Environmental Protection Bureau; from 2018 to 2020, the teacher of the Department of Chemical and Materials Engineering served as the review committee of the oil fund refund application for the input of petroleum for the manufacture of petrochemical raw materials by Formosa Plastics and China National Petroleum Corporation, as well as the performance appraisal committee member of the energy technology research and development group, and served as a member of the energy technology project plan technical review committee from 2019 to 2020; the faculty of the Department of Water Envi-



ronment and Environmental Engineering was awarded to implement the "Industrial Innovation R&D Program of the Ministry of Education Subsidy for Universities," the theme of the program is "Waste incineration fly ash recycling production waste water ceramic filter membrane full recovery and cleaning process"; teaching faculties of the Department of Economics participated in the review of the research project of the Energy Bureau of the Ministry of Economic Affairs, and puts forward a number of suggestions on feasible ways to save energy. In addition, the faculty also participates in the special plan of the Ministry of Science and Technology of the Legal Person Section and provides the review opinions of relevant ministries (Technology Division of the Ministry of Economic Affairs and the Division of Small and Medium-sized Enterprises) on the promotion of energy conservation and green energy in Taiwan.

## Assistance to low-carbon innovation

TKU encourages the cultivation and support of low-carbon economy or technology startups, and the relevant industry-university cooperation is explained as follows:

1. The Office of General Affairs collaborated with a teaching faculty with the expertise on Information from the Department of Information Management to assist the energy management technology service companies to create joint industry-academia cooperation opportunities, this successfully won the government's (Industry Bureau of the Ministry of Economic Affairs) plan for resource injection, creating a win-win situation.
2. The Champion Incubation Center provides regular tutorials for new startups applying low-carbon economy or technology; for



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## SDG7：可負擔的潔淨能源

2020 年溫室氣體排放量：14,754.63 tCO<sub>2</sub>-e（較 2019 年減少 6.5%）

2020 年淡水校園耗能密度（Energy Use Intensity, EUI）：  
32.78（較 2019 年降低 6.18%）

2020 年環保相關課程或活動之教職員工生參與人次：26,874 人次。



## 潔淨能源措施

清潔能源措施本校符合 7.2.1 至 7.2.5 各細項指標，唯獨 7.2.6 因本校並無設置基金轉投資。以下分為國際標準導入、計畫實施管考及節能績效肯定簡要說明：

1. 國際標準導入：本校自 2003 年實施 ISO14001 環境管理標準以來，始終秉持「節能減碳」的理念，配合政府要求逐步落實各項節能措施，例如 2006 年淡水校園建置節能監控系統、2013 年依據 ISO14064-1 標準辦理校園溫室氣體排放量查證，2015 年導入並通過 ISO50001 能源管理標準迄今，不僅有效降低本校用電量，達成近 6 年來淡水校園節電率每年至少 1% 的目標；同時也為學校節省大筆經費，電費從最高峰新台幣 9,126 萬元/年，2020 年降至新台幣 6,628 萬元/年。
2. 計畫實施管考：除了透過 ISO 國際標準協助執行外，校內組織成立了「環境永續推動委員會」，由行政副校長擔任主任委員，負責督導、審查及檢討各項節能計畫的執行效益，三個校園每一學年度必須提出之新的節能計畫，並確予落實。
3. 節能績效肯定：2011 至 2013 年，連續三年獲頒中華民國「企業環保獎」，2017 年本校獲得行政院經濟部「節能標竿獎」銀獎，2019 年淡水校園新落成之守謙國際會議中心獲得綠建築銀級標章，皆代表政府對於本校實踐能源使用高效率之肯定。

## 建築方面的節能措施

綠建築係指在建築生命週期中（指由建材生產到建築物規劃、設計、施工、使用、管理及拆除之一系列過程），消耗最少地球資源，使用最少能源及製造最少廢棄物的建築物。簡而言之：綠建築就是生態、節能、減廢、健康的建築，九大指標包含生態多樣性指標、綠化量指標、基地保水指標、日常節能指標、二氧化碳減量指標、廢棄物減量指標、室內環境指標、水資源指標及污水垃圾改善指標。本校積極依循綠建築九大指標中樓館新（改）建時之準則：本校蘭陽校園第一期建築工程於 2006 年 9 月獲得內政部核定頒發綠建築標章後，淡水校園 2018 年興建完成之守謙國際會議中心大樓，亦於 2019 年 5 月獲得綠建築標章銀級。

## 建築能源效率升級

1. 淡水校園每年皆編列節能改善工程預算，將舊機型之耗能空調設備更新為新式高效能空調設備，照明設備亦將傳統式燈具汰換為 LED 節能燈具，並藉由校園能源監控



管理系統有效率監管各設備運作狀況。2020 年包括以 1,630 萬元執行圖書館冰水主機汰換成離心式節能主機。

2. 建築系系館立面為全台灣校園內第一座以玻璃為材質之太陽能帷幕牆，二、三、四樓牆上與屋頂都裝上太陽能板，所獲電力能提供系館各樓層之抽風機使用，以保持工作室通風流暢。之後，亦將會於屋頂裝置捕風塔，以降低夏日室內溫度。
3. 淡水校園體育館、游泳館頂樓預計架設太陽能光電板，導入綠能發電技術並有效增加屋頂隔熱，降低原有運動場館之空調負荷。

## 減碳及降低碳排放

本校重視節能減碳工作，首先於 2013 年通過 ISO14064-1 溫室氣體排放量查證。查證範圍依本校界定邊界範疇內之排放源為直接或間接排放，分為範疇一與範疇二：

1. 範疇一主要來自直接溫室氣體排放，如校內使用汽油等；範疇二則涵蓋能源間接溫室氣體排放，例如購買之電力等。
2. 範疇二為間接排放源，亦是本校溫室氣體排放主要來源，其中外購之電力約占全體排放總量之 92%以上，故本校設定節電目標做為減少碳排放之行動方案，而後導入 ISO50001 能源管理系統，有效降低校園用電同時減少二氧化碳排放。2020 年本校碳排放量為 13,208 公噸，較前一年相比減少 6.7%。

## 節能計畫

本校每年皆召開環境永續推動委員會議，研討 3 個校園新學年度之節能計畫，定期督導並檢討各校園計畫執行情形。為因應氣候變遷暖化問題、符合經濟部推動政府機關及學校「每年節電 1%」計畫，淡水校園在 2021 學年度以降低淡水校園 EUI 值 1%為目標，預計用電量降低 23.4 萬度，減碳約 11.9 萬公斤。實施策略包括樓館用能管控，達成設備節能，包括：

1. 外語大樓 2 樓冷氣機汰舊更新工程。
2. 鍾靈化學館 3、4 樓多聯式變頻冷氣機汰舊更新工程。
3. 鍾靈化學館第 2 期照明改善工程。

4. 科學館照明改善工程。另外配合由總務處輔導各樓館執行節能管理工作，能管員確實記載各空間用電情形，進行用電分析，並依分析結果，向耗能較高之單位進行輔導節能管理工作，討論及改善各空間用電情形。

## 能源浪費審查

本校自 2015 年導入 ISO50001，使組織建立系統與過程以改善能源績效，包括能源效率、使用及消耗。它適用於不同組織形式及能源使用要求，包括：績效監督量測、重要管理流程文件化與績效報告、設備之設計與採購流程等，以展現符合法規及利害關係者要求。本校每年依據 ISO50001 能源管理系統條文要求，辦理各校園能源審查作業，以掌握能耗密集之單位及空間設備，進一步實施能耗管理。運作五年來已掌握住校園用電大宗（例如：前 20 大用電單位），後續透過 80/20 法則著重上述改善機會點為要，因系統而建立之能源基線、能源績效指標等檢核工具，內化至各校園總務單位持續辦理。

## 降低對高排碳產業的依賴度

2020 年間，透過本校與台灣電力公司間契約容量的降低，達成減少對於燃煤（或燃氣）發電的依賴程度；淡水校園 A 區契約容量從 4,999KW 降為 3,950KW，B 區契約容量從 3,100KW 降為 2,600KW，蘭陽校園契約容量亦從 790KW 降低至 600KW。

## 能源利用密度

每平方米的耗能：32.784%

總耗能（千兆焦耳）：93416.4252

大學建築的建築面積（平方米）：284948

## 能源與社區

1. 大學之間的合作：本校響應並簽署「塔樂禮宣言」（The Talloires Declaration），於 2013 年與國立臺灣師範大學等大專院校共同倡議催生「臺灣綠色大學聯盟」，作為永久會員學校之一，持續參與聯盟各項環境與能源議題的研討，包含綠色校園實踐作為，設置綠能發電議題，及內化聯合國 SDGs 目標等；自 2019 至 2021 年，本校校長亦擔任該聯盟監事。



2. 執行政府計畫案：本校數個系所教師皆在能源領域貢獻所長，包含建築系、化材系、水環系、資工系及經濟系等，透過擔任評審委員、執行研究計畫或負責機關培訓等不同身分，持續與產官學界合作發揮影響力。
3. 大學大手牽小手：為了落實「全球在地化」本校扮演火車頭角色，帶領淡水、蘭陽，甚至北海岸地區中小學共同成長；2019年底，本校了結合七所小學、淡水在地 NGO 團體，以及淡水區公所，共同發表「生態永續淡水宣言」，凝聚公私部門力量，展現淡水地區對於生態保育與環境保護的決心。
4. 鼓勵開發與創新：「未來化」係為本校三化教育理念之一，而為實踐未來化最直接的途徑就是秉持 PDCA 的精神，不斷地開發與創新，以因應世界的變局。校內各單位不但要升級轉型（A 軌），還要力求創新轉型（B 軌），校外則透過產學合作案，支持低碳經濟或技術的新創企業發展；在自身資源有限下持續爭取經費挹注，扶植符合綠色經濟的新創企業，落實大學取之於社會，貢獻予社會的使命。

## 社區能源效率教育

本校在當地社區舉辦相關活動，以了解能源效率和清潔能源的重要性，相關說明如下：

1. USR 計畫相關作為：本校與淡水周邊七所小學共同舉辦「校園 SDGs 環境永續工作坊」，凝聚共識，針對政府、學校、個人層面分別提出三項行動方案：
  - (1) 政府應以綠色能源代替火力發電，進行物種保護與山坡地維護；
  - (2) 學校應落實環境教育並減少資源耗用；
  - (3) 個人則應減少使用塑膠製品、降地垃圾及各類廢棄物，及盤點個人碳足跡等。
2. 相關計畫案：大陸所教師執行教育部教學實踐研究計畫，邀請金山高中教師演講討論金山核能廢棄物處置與地方創生議題。藉由深耕林美、在地國際計畫，前往宜蘭玉田、三民及龍潭三所小學，以環境保護為主題，透過 DIY 製作及遊戲，教導同學們環境保護、分類的重要性。
3. 教育宣導活動：各學院於每學期向教職員宣導節能與環安衛生配合事項。例如：文學院大傳系配合學校能源及環境安全衛生目標執行，「淡江影像藝術工坊」照片沖洗、放大所使用藥劑，依規定定期回收及管理，減少對環境之影響。促進 100% 可再生能源

## 促進 100%可再生能源

本校透過合作案、研究計畫、活動，促進實現 100%可再生能源的承諾，相關作為如下：

1. 合作案：本校積極與太陽能光電板公司合作，優先於淡水校園設置太陽能發電系統，於 2021 年暑假動工。
2. 研究計畫：大陸所教師於 2020 年教育部教學實踐研究計畫，邀請台灣地熱資源發展協會秘書長演講地熱與未來能源。
3. 相關活動：各學院及各系於辦公室和會議室擺放紙類回收箱、碳粉匣回收箱，並落實回收。

## 協助產業提升能源效率

本校透過能源效率評估及舉辦相關會議，積極促進能源效率和清潔能源，相關作為如下：

1. 能源效率評估：本校育成中心提供進駐廠商經營企業時能源使用效率的評估，並提供免費方案建議，例如進駐廠商「巨獸綠色科技有限公司」在本校育成中心的輔導下已成立示範場，將當地許多無法處理的廢棄豆渣與汙泥，提供給該公司供其所飼養的黑水虻食用，黑水虻不但可以分解上述廢棄物，在農業上也可以做為畜牧的飼料與植物的肥料；在商業方面，亦可產為面膜，處理了部分工廠廢棄的污染源，並提供附加價值產品。



2. 相關會議：大陸所教師舉辦「臺耘在東南亞進行環保汙染防治的成效」研究會，以了解環保汙染防治的成效。歐研所教師參加「2019 年第四次台歐盟論壇」，解釋歐盟綠色交易白皮書，談及歐盟永續發展、潔淨能源轉型、生產與消費的減排措施等議題。

## 協助政府制定潔淨能源政策，發展節能科技

本校在清潔能源和節能技術政策方面，向政府提供訊息和支持，相關作為如下：

1. 本校為「臺灣綠色大學聯盟」創始會員及永久會員學校之一：2013 年，我國關心環境保護及永續發展之大專校院，共同倡議成立「臺灣綠色大學聯盟」（Green University Union of Taiwan），本校為創始會員及永久會員學校之一，並於 2019 至 2021 年擔任監事學校，就大專校院節能減碳與實踐 SDGs 的議題，持續發揮影響力。
2. 與新北市政府合作推動綠精靈計畫：建築系教師擔任環保局公務人員機關節能與節能減碳講師；化材系教師於 2018 至 2020 年間，擔任台塑、中油公司輸入石油供作製造石化原料進料申請石油基金退費審查委員，以及能源領域技術研發組績效評鑑委員，並於 2019 至 2020 年擔任能源科技專案計畫技術審議委員會委員；水環系教師授執行「教育部補助大學產業創新研發計畫」，計畫名稱「垃圾焚化飛灰循環利用生產廢水陶瓷濾膜之全回收清潔製程」；經濟系教師參與經濟部能源局研究計畫案審查，針對節能之可行作法提出多項建議，另外，也參與科技部法人科專計畫，就促進我國節能與綠能的方案，提供相關部會（經濟部技術處與中小企業處）審查意見。

## 支持低碳新創企業

本校鼓勵培育和支持低碳經濟或技術的新創企業，相關產學合作說明如下：

1. 本校總務處媒合資管系資訊專長教師，協助能源管理技術服務類公司製造共同產學合作機會，成功爭取政府（經濟部工業局）計畫案的資源挹注，共創多贏的局面。
2. 本校育成中心提供應用低碳經濟或技術的新創企業定期輔導，例如：提供進駐廠商「巨獸綠色科技有限公司」、「力德環境科技有限公司」每個月兩次以上的相關諮詢輔導，輔導其申請政府計畫案及提供貸款與創業基金等資訊，發展環境軟體開發應用計畫。育成中心亦開設課程以支持低碳經濟或技術的新創企業，如募資與行銷等，並媒合與本校教師之產學合作。



# TAMKANG UNIVERSITY

No.151, Yingzhuan Rd.,  
Tamsui Dist., New Taipei City 251301,  
Taiwan (R.O.C.)  
Tel:+886-2-2621-5656