



University : National Chin-Yi University of Technology  
Country : Taiwan  
Web Address : www.ncut.edu.tw

## [SDGs 17] Partnership for the Goals 全球夥伴

### [17.3.7] Please indicate if your university publishes progress against SDG 7?

NCUT is firmly committed to advancing energy efficiency and promoting sustainable energy use, in alignment with the United Nations Sustainable Development Goal 7 (Affordable and Clean Energy). Guided by the *Energy Policy* endorsed by President Dr. Chen Wen-yuan, NCUT's approach is rooted in environmental protection, energy conservation, and low-carbon development. The university strictly complies with government energy regulations and efficiency standards, striving to reduce overall energy consumption and greenhouse gas (GHG) emissions.

### Energy Management and Governance

To ensure systematic and measurable progress, NCUT has implemented a comprehensive energy management system, certified under **ISO 50001**. This system integrates planning, implementation, monitoring, and review processes, ensuring that energy-saving objectives are embedded across all operations. A key element of success is fostering a culture of collective responsibility—engaging faculty, staff, and students to take active roles in energy conservation initiatives.

### Key Actions and Initiatives

#### 1. Campus-Wide LED Lighting Upgrade

- Replacement of all indoor, outdoor, walkway, bulletin board, and emergency lighting systems with energy-efficient LED fixtures.
- Sensor-activated lighting in selected areas to maximize daylight use and minimize unnecessary power consumption.

#### 2. High-Efficiency Air Conditioning

- Replacement of outdated units with high-efficiency models, standardizing indoor temperatures at **26°C** to optimize comfort while minimizing energy use.

#### 3. Upgraded Emergency Lighting Systems

- Installation of LED fire evacuation indicator lights to reduce electricity consumption during continuous operation.

#### 4. Energy-Saving Water Dispensers

- Deployment of environmentally certified dispensers equipped with nighttime power-down functions to save energy during non-operational hours.

## 5. Renewable Energy Deployment

- Installation of solar photovoltaic (PV) and solar thermal systems on the Engineering Building, Chin-Yi Student Dormitory, and Machine Tool Building.
- Real-time solar power generation data made publicly available on NCUT's website to enhance transparency and community engagement.

## 6. Wind-Solar Complementary Street Lighting

- Integration of hybrid wind-solar lamps for campus pathways, reducing reliance on grid electricity and showcasing renewable innovation.

### Performance Outcomes

Initiative	Measurable Outcome	Impact
LED lighting upgrade	Significant reduction in electricity use for lighting systems	Contributes to reduced GHG emissions
High-efficiency air conditioners	Lower electricity demand during peak summer months	Improves comfort with reduced energy intensity
Renewable energy systems	Solar PV and thermal capacity installed; real-time monitoring	Supports campus energy diversification
Energy-saving water dispensers	Power-down function cuts energy use during off-hours	Reduces operational costs
ISO 50001 certification	Formal recognition of robust energy management	Aligns with international standards

## 7. GTEA Green Technology Engineering and Application Program

This flagship program includes the **annual GTEA seminar**, hosted by the College of Engineering and co-organized by multiple departments. The 2025 edition gathered experts from industry, academia, and government to address challenges in **green manufacturing, hydrogen energy, carbon cycle technology, and smart machinery**. Keynote speakers from international research institutions and leading corporations highlight NCUT's role as a hub for sustainable engineering innovation.



## 8. Large Solar Photovoltaic Technology Communications

NCUT acknowledges the growing role of solar photovoltaic (PV) power generation as a vital renewable energy source. However, given the inherent intermittency and unpredictability of solar systems, the university recognizes that the integration of solar power into the energy grid requires reliable forecasting mechanisms to ensure stability and efficiency.

To address this, NCUT has implemented a data-driven communication and monitoring system designed to enhance the management of solar energy generation. This initiative integrates:

- **Data Collection Systems:** Continuous recording of solar power generation data to establish predictive relationships between energy output and training models.
- **Weather-Based Forecasting:** Utilization of meteorological data—such as sunlight exposure, temperature, and cloud coverage—to predict fluctuations in solar panel efficiency.
- **Efficiency Optimization:** Forecasting the heating performance of solar panels under different weather conditions to improve overall energy yield.
- **Rainfall Integration:** Incorporating rainfall data to predict solar panel cleaning needs, ensuring maximum efficiency and reducing manual maintenance frequency.

Through this initiative, NCUT enhances the communication between solar energy systems and grid management, thereby improving the stability of renewable energy output. This effort also supports the university's long-term sustainability goals, contributing to Taiwan's transition toward a low-carbon, renewable energy future.

## 9. NCUT's Commitment to Renewable Energy and Sustainable Practices

NCUT is actively committed to developing a robust renewable energy infrastructure, with a strong emphasis on solar power systems aimed at reducing peak power consumption and promoting electricity conservation. The university has implemented several key initiatives to support these goals:

- **Engineering Building Solar Power System**

The top floor of the Engineering Building houses a solar power generation system that efficiently

stores generated electricity. This energy is then distributed throughout the building during peak demand periods.

- **Engineering Hall Thermal Power Generation**

The uppermost floor of the Engineering Hall features an innovative thermal power generation system. This system harnesses the sun's ultraviolet rays to heat an electric unit, effectively converting thermal energy into electricity.

- **Machine Tool Building Solar Installation**

The Machine Tool Building is equipped with a substantial 332.64-kilowatt solar power generation system. This installation includes real-time power generation monitoring, which is accessible online, offering transparency and insights into energy production.

- **Chin-Yi Student Dormitory Solar Power System**

The Chin-Yi Student Dormitory features a 90.72-kilowatt solar power system. Similar to the Machine Tool Building, it provides real-time power generation data through online platforms, allowing for continuous energy monitoring.

- **New Solar Installations**

In August 2024, NCUT installed 1,150 kWp of solar power generation equipment across three locations: the parking lot, Luming Terrace, and Yanghao Dormitory. These additions have significantly increased the university's renewable energy capacity.

Through these initiatives, NCUT not only demonstrates its dedication to sustainable practices but also highlights its commitment to integrating modern technologies for efficient energy utilization.



The solar power generation system has been installed on the rooftop of the Engineering Building with the purpose of storing and supplying electric energy to the building during periods of peak power demand.

The thermal power generation system has been constructed on the uppermost floor of the Engineering Building. This innovative system harnesses the sun's ultraviolet rays to irradiate an electric heating system, effectively converting thermal energy into electricity.



臺中市 > 太平區 > 國立勤益科技大學(工具機大樓) 案場概況 Solar Power Site Information

2025-06-16 13:28

<p>國立勤益科技大學(工具機大樓)</p> 	<p>案場資訊</p> <p>地址： 臺中市太平區中山路二段57號</p> <p>建置日期： 2020-03-09</p> <p>維護公司： 大同</p>	<p>太陽能系統規格</p> <p>並聯電壓： 3相4線220/380V</p> <p>架設結構： 棚架型/斜屋頂型/平屋頂地面型支撐架</p> <p>模組規格： 同昱 GTEC-315G6S6A</p>	<p>變流器相關資訊</p> <p>變流器型號： 盈正 ES52000HC/ES25600HC/ES12000</p> <p>變流器數量： 2/6/2</p>
<p>發電概況</p>			
<p>今日發電度數 <b>453</b> kWh</p>	<p>裝置容量總計 <b>332.64</b> kWp</p>	<p>總即時發電功率 <b>137.95</b> kW</p>	<p>累積總發電度數 <b>2216.181</b> MWh</p>
<p>模組溫度 <b>47</b> °C</p>	<p>日照強度 <b>509</b> W/m<sup>2</sup></p>	<p>累積減碳量 <b>1181.224</b> 噸</p>	<p>累積減碳已種植樹量 <b>157497</b> 棵</p>

臺中市 > 太平區 > 國立勤益科技大學(勤益學舍) 案場概況 Solar Power Site Information

2025-06-16 15:2

<p>國立勤益科技大學(勤益學舍)</p> 	<p>案場資訊</p> <p>地址： 臺中市太平區中山路二段57號</p> <p>建置日期： 2020-03-09</p> <p>維護公司： 大同</p>	<p>太陽能系統規格</p> <p>並聯電壓： 3相4線220/380V</p> <p>架設結構： 棚架型</p> <p>模組規格： 同昱 GTEC-315G6S6A</p>	<p>變流器相關資訊</p> <p>變流器型號： 盈正 ES52000HC/ES25600HC</p> <p>變流器數量： 1/1</p>
<p>發電概況</p>			
<p>今日發電度數 <b>215</b> kWh</p>	<p>裝置容量總計 <b>90.72</b> kWp</p>	<p>總即時發電功率 <b>10.04</b> kW</p>	<p>累積總發電度數 <b>640.903</b> MWh</p>
<p>模組溫度 <b>46.6</b> °C</p>	<p>日照強度 <b>131</b> W/m<sup>2</sup></p>	<p>累積減碳量 <b>341.601</b> 噸</p>	<p>累積減碳已種植樹量 <b>45547</b> 棵</p>

A solar power generation system with a capacity of 332.64 kilowatts has been installed in the Machine Tool building. This system enables real-time monitoring of power generation data through online platforms.

The Chin-Yi student dormitory is equipped with a solar power generation system boasting a capacity of 90.72 kilowatts. This installation allows for the convenient retrieval of real-time power generation data via the Internet.





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NCCU



Building	Device capacity (kWp)	Date	Power generation/Month (kWh)	Cumulative total power generation (kWh)
Chin-Yi student dormitory	90.72	2022-08	11,248	64,440
Chin-Yi student dormitory	90.72	2022-09	11,258	75,698
Chin-Yi student dormitory	90.72	2022-10	10,623	86,321
Chin-Yi student dormitory	90.72	2022-11	8,370	94,691
Chin-Yi student dormitory	90.72	2022-12	7,573	102,264
Chin-Yi student dormitory	90.72	2023-01	9,476	111,740
Chin-Yi student dormitory	90.72	2023-02	10,020	121,760
Chin-Yi student dormitory	90.72	2023-03	10,798	132,558
Chin-Yi student dormitory	90.72	2023-04	10,522	143,080
Chin-Yi student dormitory	90.72	2023-05	13,253	156,333
Chin-Yi student dormitory	90.72	2023-06	9,561	165,894
Chin-Yi student dormitory	90.72	2023-07	11,962	177,856
Chin-Yi student dormitory	90.72	2023-08	10,376	188,232
Chin-Yi student dormitory	90.72	2023-09	10,854	199,086
Chin-Yi student dormitory	90.72	2023-10	9,918	209,004
Chin-Yi student dormitory	90.72	2023-11	8,532	217,536
Chin-Yi student dormitory	90.72	2023-12	9,021	226,557
Chin-Yi student dormitory	90.72	2024-01	8,540	235,097
Chin-Yi student dormitory	90.72	2024-02	7,942	243,039
Chin-Yi student dormitory	90.72	2024-03	10,945	253,984
Chin-Yi student dormitory	90.72	2024-04	11,903	265,887
Chin-Yi student dormitory	90.72	2024-05	9,222	275,109
Chin-Yi student dormitory	90.72	2024-06	10,565	285,674
Machine Tool building	332.64	2024-06	42,675	118,311
Machine Tool building	332.64	2024-07	44,053	162,364
Machine Tool building	332.64	2024-08	39,467	201,831
Machine Tool building	332.64	2024-09	40,130	241,961
Machine Tool building	332.64	2024-10	37,910	279,871
Machine Tool building	332.64	2024-11	30,903	310,774
Machine Tool building	332.64	2024-12	28,108	338,882
Machine Tool building	332.64	2025-01	34,807	373,689
Machine Tool building	332.64	2025-02	36,885	410,574
Machine Tool building	332.64	2025-03	39,123	449,697
Machine Tool building	332.64	2025-04	37,984	487,681
Machine Tool building	332.64	2025-05	43,915	531,596
Machine Tool building	332.64	2025-06	32,294	563,890
Machine Tool building	332.64	2025-07	41,966	605,856
power generation yearly			762,702	

### 10. The research fund dedicated to sustainability research & Energy inventory

Item	Project	USD
NSTC 113-2221-E-167-012-MY3	Research on quality improvement and carbon reduction in industrial motor shaft manufacturing process	34,250
NSTC 113-2221-E-167-013-MY3	Management system and model establishment and analysis in smart manufacturing environment - Sub-project 4: IC packaging process quality assessment and green outsourcing supplier selection model in smart manufacturing environment (2/3)	35,000
NSTC 113-2221-E-167-017-MY2	2024 Manufacturing Transformation Promotion Plan - Carbon Inventory Value-added Application - Hand Tool Forging Industry Organized Carbon Inventory and Low Carbonization Guidance Plan	25,000
NSTC 113-2221-E-167-023	Development and implementation of crop pest image recognition system - taking Taiwan tomatoes as an example (3/3)	31,100
NSTC 113-2221-E-167-029	2024 Academic Community Promotes Local Industry Technology Value-added Innovation Plan - Digitalization, Intelligence, Leanness and Low Carbonization of Hand Tool Industry	34,500
NSTC 113-2221-E-167-012-MY3	Central Taiwan cross-school integrated scientific research industrialization platform project	50,310
NSTC 113-2221-E-167-013-MY3	Study on the preparation of flame-retardant polyurethane composites from biowaste coffee grounds for energy storage systems to prevent thermal runaway (1/2)	55,000
NSTC 113-2221-E-167-017-MY2	Preparation of flame-retardant backsheet materials for solar panels using self-assembled dual core-shell zeolite imidazole framework-8 (ZIF-8) and its fire retardant properties (1/3)	47,035
NCUT24TEM070	2024 College and University Teaching Practice Research Project - Net Zero Carbon Emission Sustainable Education and LCA Life Cycle Assessment Organization (campus, family and extracurricular activities) and Product Carbon Footprint Inventory and Carbon Label Application Practice	25,650
NCUT24TEM075	Green Energy Institute - Green material synthesis and processing commissioned test work	91,755
NCUT24TEM078	2024 Meishi Pharmaceutical Clean Room System Test Verification Analysis	91,207
NCUT24TEM081	2024 Manufacturing Transformation Promotion Plan-Carbon Inventory Value-added Application-Yuan Yang Industrial Co.,	22,000

	Ltd. Service Plan	
NCUT24TEM031	Greenhouse gas inventory and plant carbon emission source reduction technology	20,000
NCUT24TEM032	Circular Economy and Carbon Footprint Communication Resilience Strategy: The Double-edged Sword of Net Zero Carbon Emissions (1/2)	30,345
NCUT24TEM034	Analysis of greenhouse gas emissions from open space combustion heating processes	26,000
NCUT24TEM036	Air conditioning system measurement and performance verification for the first phase of the new construction project of the Kaohsiung Show Chuan Memorial Hospital Medical Building	75,000
NCUT24TEM037	Research and demonstration of new ion solution applied to outdoor air conditioning dehumidification system (2/2)	269,690
NCUT24TEM039	Coffee grounds recycling filter material service process planning	43,620
NSTC 113-2218-E-005-010	Low-carbon, energy-saving and intelligent machine tool fluid system and dynamic machining cutting fluid control optimization analysis research (1/3)	40,928

Total research fund dedicated to sustainability research in 2022 = 15,679,707 US Dollars

Total research fund dedicated to sustainability research in 2023 = 15,470,437 US Dollars

**Total research fund dedicated to sustainability research in 2024 = 15,737,791 US Dollars**

**The averaged annum last 3 years of research fund dedicated to sustainability research =15,629,323US Dollars**

### Alignment with SDG 7 Targets

- **Target 7.2:** Increase substantially the share of renewable energy – NCUT’s deployment of solar PV and wind-solar lighting directly contributes to renewable energy generation on campus.
- **Target 7.3:** Double the global rate of improvement in energy efficiency – Campus-wide LED upgrades, efficient air-conditioning, and smart systems demonstrate measurable progress toward this target.
- **Target 7.a:** Enhance international cooperation – Public sharing of solar energy data supports knowledge dissemination and community awareness.

NCUT’s commitment to energy efficiency and sustainability is reflected in tangible infrastructure upgrades, robust governance through ISO 50001, and renewable energy integration. These actions not only reduce operating costs and carbon emissions but also position NCUT as a leader in sustainable campus management in Taiwan. Through continuous innovation and stakeholder engagement, NCUT will continue to expand its renewable energy portfolio, improve energy efficiency, and serve as a model for higher education institutions striving to meet the SDG 7 agenda.