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[SDGs 6] Clean Water and Sanitation 淨水與衛生

[6.5.4] Does your university as a body, where water is extracted (for example from aquifers, lakes or rivers), utilise sustainable water extraction technologies on associated university grounds on and off campus?

NCUT's Water-Energy Innovation: The Water Energy Conversion System

NCUT has established the Institute of Global Energy & Environmental Technology Science to pioneer sustainable solutions that achieve local energy balance—a critical foundation for long-term coexistence, prosperity, and survival of both enterprises and the environment.

At the heart of this initiative is the Water Energy Conversion System (WECS), a breakthrough technology that enables companies to utilize water as a source of energy. By constructing closed water energy reservoirs, enterprises can stabilize water supply during droughts and store rainwater during extreme storms, effectively preventing both water shortages and flood disasters. The system balances ecological preservation with economic benefits, reducing environmental impact while enhancing operational efficiency.

A practical example highlights the system's capacity:

- The TSMC Zhongke Plant (Plant 15) requires approximately 16,000 tons of water per day, totaling 5.84 million tons annually.
- By constructing a 400 m × 400 m × 10 m closed water energy reservoir, the system can stably supply 1.6 million tons of water during the dry season, directly supporting industrial resilience.
- Beyond water supply, the reservoir stores energy by producing ice water and hot water at night to meet daytime demand, effectively shifting peak power loads and enhancing energy efficiency.

Through the WECS and the Institute's research, NCUT is advancing water-based energy management technologies that align with global sustainability goals. This innovation exemplifies how enterprises can thrive while safeguarding ecological balance, setting a new benchmark in sustainable industrial development.

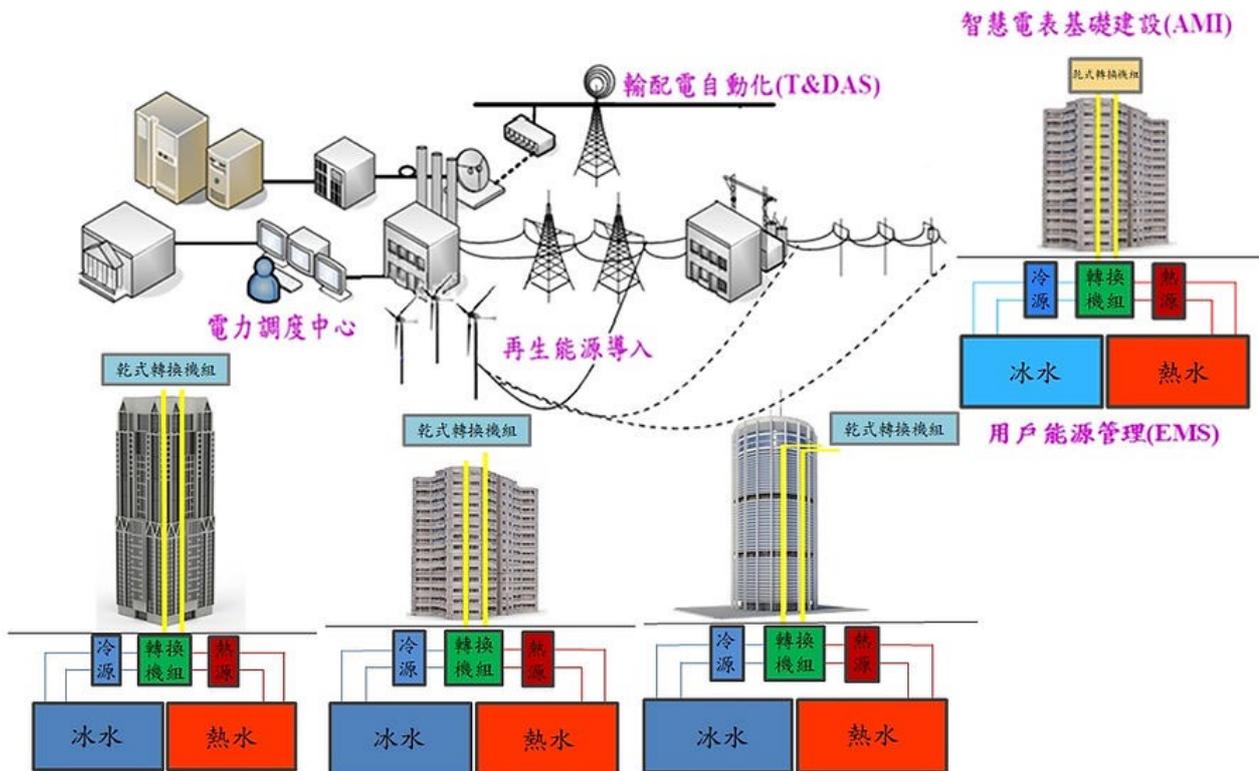


The water demand of TSMC Zhongke Plant (Plant 15) is 16,000 tons per day, and the annual water demand is 5.84 million tons.

Assuming that a 400 m X 400 m X 10 m closed water energy reservoir is built, 1.6 million tons of water can be supplied stably during the dry season.

The energy needed during the day is produced at night and stored in a closed water energy reservoir to supply ice water and hot water demand, shifting peak power loads.





1. No Direct Extraction from Natural Sources

- NCUT does not pump or extract water directly from aquifers, rivers, or lakes.
- Mingxiu Lake, the ecological lake on campus, is not a natural extraction point. It is maintained using recycled wastewater (about 40% of treated campus sewage) and collected rainwater

2. Sustainable Substitution of Extraction

- By maximizing treated wastewater reuse and rainwater harvesting, NCUT avoids the need for unsustainable extraction from groundwater or natural water bodies.
- Systems are designed to comply with the Water Pollution Prevention and Control Act and Taiwan's Water Resources Conservation standards.

3. Monitoring and Control

- Digital water meters monitor mains water intake and reuse volumes across all buildings
- NCUT's sewage treatment facility has flow meters on inflow and outflow, ensuring transparent measurement of recycled water

4. Off-Campus Initiatives



- Through industry collaboration projects (e.g., High-tech Industry Water-Saving Technology Tutoring), NCUT promotes sustainable water management and reduced extraction in Taiwan's water-intensive industries

Contribution to SDGs

- **SDG 6 – Clean Water and Sanitation:** Avoids unsustainable extraction by substituting recycled and harvested water.
- **SDG 12 – Responsible Consumption and Production:** Promotes efficient use and reuse of water resources.
- **SDG 13 – Climate Action:** Reduces dependency on vulnerable natural water sources, building climate resilience.
- **SDG 17 – Partnerships for the Goals:** Supports industry and community to implement sustainable water strategies off campus.