



Taipei Dome's Distributed Pumping System journey: Powered by sustainability

The situation: The challenge of oversized HVAC

The Taipei Dome is a landmark multi-purpose indoor stadium and commercial complex, designed to host major national and international sporting events—including being Taiwan's first standard indoor baseball stadium—and large-scale concerts, accommodating nearly 50,000 attendants. The vast and variable occupancy of the stadium and its surrounding commercial facilities (shopping mall, cinema, offices, and hotel) presents a complex demand for both cooling and water supply. To meet these massive and fluctuating HVAC (Heating, ventilation, and air conditioning) needs, the project faced a common challenge in large-scale construction: **overdesigned traditional HVAC systems.**

These systems, often configured as primary/secondary variable systems using centralized differential pressure control, typically require designers to oversize the pump head to ensure sufficient pressure at the end-of-line units. This overdesign results in a lower system temperature differential (Delta T), significantly compromising overall efficiency and leading to substantial, unnecessary energy waste in a building aiming for energy conservation and carbon reduction. The customer's primary objective was to find a high-efficiency HVAC solution that could reliably deliver a comfortable climate environment while minimizing its energy footprint.

The solution: Grundfos Distributed Pumping System (DPS)

Grundfos stepped up to this complex challenge by recommending a state-of-the-art **Distributed Pumping System (DPS)** solution for the chilled water supply, alongside highly efficient pumps for the primary loop and the general water supply system.

1. Primary loop optimization:

The primary loop pumps for the chiller plant room (including LF and LS pumps) were sized solely to meet the precise flow and pressure requirements of the chillers, avoiding the overcapacity typical of traditional setups.

2. Secondary loop decentralization (DPS):

The secondary side adopted the distributed design:

- Each major air handling unit (AHU) was equipped with its own intelligent pump (**TPE pumps**).
- These pumps are controlled based on the AHU's supply or return air temperature, allowing the system to respond precisely to actual cooling demand.
- For smaller fan coil units, a group control strategy was implemented.

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- Pump operation is managed using constant or proportional pressure control.

This decentralization replaces the need for complex control valves, providing continuous and automatic system balancing. It significantly reduces system complexity and ensures that the entire HVAC system operates at peak efficiency.

3. Integrated Water Systems:

Simultaneously, Grundfos provided comprehensive water supply and boosting solutions (4CR boosters, 2CM boosters, LF, CR, and CM pumps) to reliably serve the entire complex. All systems are connected to the Building Management System (BMS), enabling the Farglory Group to monitor and manage all water systems centrally for ultimate control and efficiency.



The outcome: Optimized performance and significant energy savings

The implementation of the Grundfos DPS and highly efficient water systems delivered spectacular results for the Taipei Dome, ensuring optimal occupant comfort combined with a minimized climate footprint:

- **Verified energy reduction:** Preliminary comparisons between the Grundfos DPS system and a traditional HVAC design showed a potential to reduce total pump horsepower and power consumption by approximately **40%**.
- **Optimal Temperature Differential (Delta T):** While the design target for the system Delta T was 5°C, on-site performance testing validated the effectiveness of the DPS system. The decentralized solution demonstrated its capability to achieve a remarkable Delta T 6°C. This contrasts sharply with traditional oversized systems, which typically only manage 3–4°C, proving the DPS system's ability to run the HVAC system in an optimal, high-efficiency state.
- **Future confidence:** The successful results achieved in this landmark project have given the designers from Farglory Group greater confidence in applying Grundfos' Distributed Pumping System to their future designs, validating its long-term benefits.

The Grundfos DPS and water supply systems installed in the Taipei Dome not only provide a more comfortable, ideal climate environment for large-scale events but also play a vital role in the facility's overall goals for **energy conservation and carbon reduction**.

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Products delivered (Key solutions)

Category	Product Type	Specific Solutions	Quantity (Total for Type)
Pumps for Distributed Pumping Systems	TPE pumps (Intelligent, in-line circulators)	TPE 80-410/4, TPE 80-530/2, TPE 50-340/4, TPE 32-300/2, etc.	60 pcs
Chilled & Cooling Water Pumps (Primary Side)	LF & LS pumps (End-suction)	LF80123G, LF40129G, LS 300-250-305E, LS 350-300-352C, etc.	52 pcs (48 LF, 4 LS)
Water Supply & Boosting	CR, CM, LF, Booster sets (4CR, 2CM)	CRN64-3, CRN125-2, CM5-2, CM15-2, 4CRN95-2 BOOSTER, etc.	2 sets 4CR, 2 sets 2CM, 6 LF, 22 CR/CM

Taipei Dome is a landmark construction project in Taiwan and the country's first standard indoor baseball stadium. Since 2024, it has hosted numerous major and international sporting events, as well as large-scale concerts. Grundfos' DPS system and water supply systems installed in the Dome not only provide a more comfortable climate environment but also play a vital role in **energy conservation and carbon reduction**.

This project is important for Grundfos as it showcases our signature **Distributed Pumping System** delivering provable, high-efficiency results in a highly visible, large-scale, and complex **Sports & Leisure/Mixed Use** vertical.

