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Pioneering zero carbon factory: CSCEC advances industrial decarbonization via renewable energy, hydrogen logistics and low carbon concrete, showcasing a replicable green development model for the global construction materials sector.

CHINA WEST CONSTRUCTION OVERSEAS (CHENGDU) CO., LTD.

China West Construction Group Co., Ltd. subsidiary achieves 6-Star Zero-Carbon Factory Certification: a case study in industrial decarbonization

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CSCEC Environmental Protection Building Materials Technology (Guangzhou) Co., Ltd., a subsidiary of China West Construction Group Co., Ltd. (CWCG), has been awarded the Type I, 6-Star Zero-Carbon Factory Certification. Certified by the China Academy of Building Research's Certification Center, this accolade is based on association standard T/CECA-G 0171-2022 (*Evaluation Specification for Zero-Carbon Factories*), published by the China Energy Conservation Association. This milestone, a first for CWCG, provides a reference for the decarbonization of China's building materials sector and aligns with the national "Dual Carbon" strategy.

Valid from 1 August 2024, to 31 July 2025, the certification follows a comprehensive audit encompassing eight domains, including regulatory compliance, management systems, and carbon offsetting. The facility reported annual greenhouse gas emissions of 1823.89 t of CO_2 equivalent. By implementing scientifically verified carbon offset measures, the plant achieved 100% carbon neutrality, satisfying the net-zero emission criteria for zero-carbon factories.

The facility's operations are powered by a combination of integrated clean energy and intelligent carbon management. A distributed photovoltaic (PV) and energy storage system reduces fossil fuel reliance and facilitates load shifting. This is complemented by an Intelligent Energy and Carbon Emission Management System, which provides real-time emissions monitoring across the entire production chain. Through process optimization and resource recycling in R&D, production, and administration, the company has successfully implemented a full-cycle low-carbon operational framework.

Technological innovation drives this decarbonization strategy. The facility has developed low-carbon concrete by optimizing mix designs, specifically by increasing the proportion of mineral admixtures. This innovation reduces cement consumption per unit by at least 30% without compromising structural integrity. Production logistics use 100% new-energy vehicles and

SUSTAINABILITY

Figure 1 Hydrogen-fueled concrete transport tankers promote the low-carbonization of logistics and transportation

solar-powered LED lighting. Additionally, rooftop PV panels supply 100% of the electricity for staff accommodation and administrative areas. Complementary measures, such as the electrification of cafeteria facilities and automated power controls, extend low-carbon practices throughout the value chain.

This milestone was reached against the backdrop of China's supportive policies for industrial decarbonization. The 2025 policy priorities emphasize low-carbon development in construction, mandating green building standards for all new urban construction and accelerating building-integrated photovoltaics (BIPV). In early 2026, the *Guiding Opinions on Zero-Carbon Factory Construction* outlined a three-phase decarbonization strategy and six development pathways. Concrete production is specifically encouraged to adopt circular economy practices, including solid waste substitution and wastewater recycling, to minimize emissions.

As a leading state-owned enterprise in China's construction sector, CSCEC has embedded zero-carbon factory development into its 14th Five-Year Plan. The Group's carbon roadmap targets transformative progress by 2025, peak emissions by 2030, and carbon neutrality leadership by 2060. CWCG is spearheading decarbonization efforts in the concrete industry, and this certification represents a critical step in this trajectory.

A company spokesperson stated that the certification will serve as a catalyst for further zero-carbon initiatives and low-carbon technology innovation. The company intends to optimize its distributed PV and energy storage systems, systematize replicable zero-carbon practices, and disseminate these models across the building materials sector. At the corporate level, CSCEC plans to increase R&D investment in low-carbon materials, accelerate zero-carbon factory deployment in strategic regions, and develop additional national benchmark projects aligned with decarbonization objectives.

This certification is not only a milestone for China's concrete industry but also a testament to CSCEC's contribution to the national "Dual Carbon" strategy. As global industries pursue decarbonization, CSCEC's zero-carbon model offers a valuable reference for the green transition of the international construction sector.

Figure 2 Solar and Wind Powered Intelligent Lighting System