



2025 Climate Solutions from Chinese Enterprises

应对气候变化的中国企业解决方案 (2025)

Carbon Accounts Empowering Low-Carbon Development and Boosting Export Trade

“碳账户” 助力企业低碳发展和出口贸易



国家电网
STATE GRID

国网衢州供电公司

STATE GRID QUZHOU POWER SUPPLY COMPANY

Carbon Accounts: Empowering Low-Carbon Development and Boosting Export Trade

Challenges

Quzhou, a key base for heavy and chemical industries in Zhejiang Province, has an energy intensity twice the provincial average. The absence of a unified platform to consolidate energy consumption and carbon accounting data has led to outdated, low-granularity, and infrequently updated datasets. Consequently, many enterprises lack a clear understanding of their energy and carbon efficiency, the root causes of waste, and effective cost-control pathways. A key challenge lies in defining clear decarbonization paths for enterprises to support Quzhou in building an eco-friendly, innovation-driven city that integrates pollution and carbon reduction, and enhance its green competitiveness in export trade.



Solution

State Grid Quzhou Power Supply Company ("State Grid Quzhou" for short) supported the Quzhou Municipal Government to pioneer China's first "Carbon Account" system for industrial enterprises. It launched the nation's first energy budgeting management platform, establishing a precise "budget-before-use" control model. Through a comprehensive digital energy and carbon management platform and the EMC model, the company provides enterprises with one-stop solutions for low-carbon transition, effectively driving emission reduction across the industrial sector.



An employee of State Grid Quzhou visits Ming-Want Dairy to introduce and promote carbon accounts

Data acquisition: one account provides clear carbon performance ratings

In 2021, State Grid Quzhou launched a pilot project with Ming-Want Dairy, creating China's first batch of carbon accounts for industrial enterprises. Targeting industrial and energy-intensive companies, the initiative equipped over 1,400 enterprises above designated size with energy consumption data collectors, enabling the collection of energy consumption data, like electricity and natural gas, at 15-minute intervals. This allows for precise measurement of energy use and carbon emissions across production processes, calculating total emissions and carbon intensity for each enterprise.

In collaboration with the local government, the company built a foundational data repository integrating three core datasets—energy consumption, economic indicators, and other carbon-related data. On this basis, it pioneered a "Three-Dimension, Four-Color" evaluation model, benchmarking corporate carbon performance with the industry baseline across three dimensions: industry advancement, regional contribution, and historical decarbonization progress. Enterprises are classified into four tiers to provide a more precise and differentiated reference.

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The smart integrated energy management platform clearly presents corporate energy consumption data

Process optimization: a set of rules for energy allocation

Establishing a budgeting framework: In collaboration with government agencies, State Grid Quzhou defines each enterprise's annual energy baseline based on the three-year peak consumption data of itself and the industry as well as energy-saving acceptance reports. The energy budgeting management platform is built to apply scientifically determined allocation coefficients to break down the overall budget into individual departments and production lines based on energy targets.

Enabling automatic alerts: The platform's real-time monitoring and automatic alert functions provide data-driven support for enterprises to adjust their energy plans promptly. The platform also facilitates the trading of surplus energy quotas, stimulating market activity.

Driving performance-based evaluation: The system supports the government in providing incentives, such as preferential carbon financing policies and prioritized energy allocation, to compliant enterprises. It also helps apply constraints, such as load control and deductions from the following year's allocation for overconsumption, to non-compliant ones. This approach incentivizes enterprises to accelerate technological upgrades and their low-carbon transition.

3. Decarbonization and cost reduction: a digital platform for intelligent management

To align with each enterprise's production processes, State Grid Quzhou has developed a customized, all-category digital platform for integrated energy and carbon management. Through online energy monitoring at the facility, production line, and equipment levels, the system identifies precise opportunities for energy savings and carbon reduction, enabling science-based recommendations for technological upgrades.

Building on the success of the Ming-Want Dairy pilot, the company developed a "Green Energy + Energy Conservation + Storage" EMC (energy performance contracting) model. This approach also helps enterprises access policy incentives and financial support—effectively enabling them to save energy while securing financing, thereby lowering the overall cost of decarbonization. A number of enterprises have established the EMC model.

Green energy supply: The company financed and constructed an 8MW distributed PV system and a 480kW/880kWh energy storage system for Ming-Want Dairy, supported by an integrated smart PV-storage microgrid management platform. This initiative reduces the company's annual electricity expenses by more than US\$168,000.

Energy efficiency: By optimizing production and energy schedules, and upgrading equipment under the EMC framework, Ming-Want Dairy has lowered its comprehensive annual energy costs by over US\$702,000.

Value-added incentives: The EMC project enabled the company to secure an approximately US\$2.4 million green loan at an interest rate 80 basis points below the benchmark.



Multiple Benefits

Environmental

Since the establishment of its carbon account, Ming-Want Dairy has achieved a cumulative carbon reduction of 11,801.44 tons by 2024. It has been recognized as a "National Green Factory". By the end of 2024, Quzhou's carbon account system had achieved 100% coverage of all industrial enterprises above designated size, encompassing 4,067 legal entities. During China's "14th Five-Year Plan" period (2021-2025), the city's carbon emission intensity decreased by about 19%, achieving a total carbon reduction of about 7 million tons. The share of clean energy use in the region increased by about 5%.

Economic

The carbon account system has enabled banking partners to develop financial instruments that link corporate carbon account ratings with green credit, preferential interest rates, and fiscal subsidies, thereby expanding the reach of "Carbon Account Loans." In 2024, Quzhou issued over US\$14 billion in carbon-linked loan, helping enterprises collectively reduce their financing, logistics, and energy costs by about US\$185 million. The city's trade network expanded to 205 countries and regions, with total exports surpassing US\$7 billion.

Social

Currently, Quzhou has established a total of 2.396 million carbon accounts spanning seven key sectors: industry, agriculture, energy, construction, transportation, residential life, and forestry carbon sinks. The government also uses corporate carbon evaluations as a key reference for energy resource allocation, giving priority to low-carbon enterprises. In 2024, 47 high-performing low-carbon companies received additional energy budgets totaling 2.093 million tons of standard coal, effectively channeling resources toward high-value, low-consumption industries.

Application Scenarios

Governments of energy-intensive regions, and energy-intensive enterprises, industrial parks, and their associated supply and industrial chains

“碳账户”助力企业低碳发展和出口贸易

问题与挑战

衢州市是浙江省的重化工业基地，能耗强度是全省平均水平的两倍。由于缺乏归集完整能耗量和碳核算数据的平台，各类能耗数据普遍时效性差、颗粒度粗、更新频率低，导致企业对自身能效和碳效水平长期处于消费现状不清、浪费原因不明、控费路径不知的状态。如何明确企业降碳路径，助力衢州市打造生态良好型减污降碳协同创新城市，并在拓展对外出口贸易时具备绿色竞争力，成为关键挑战。



解决方案

国网衢州供电公司支撑衢州市政府创建全国首个工业企业“碳账户”，创新推出全国首个用能预算化管理平台，构建“先预算、后用能”精准管控路径，并以全品类能碳数字化管理平台和EMC模式，为企业提供“一站式”低碳转型方案，全面推进企业降碳减排。



国网衢州供电公司员工到明旺乳业介绍推广碳账户

1.采集数据，“一个账户”算清降碳等级

2021年，国网衢州供电公司以明旺乳业为试点，创建全国首批工业企业碳账户。企业碳账户以工业和能源企业为重点，为1400余家规上企业安装能耗采集装置，实现电力、天然气等能耗数据每15分钟更新，精准采集企业能源消耗和生产工艺中的碳排放值，核算企业碳排放总量和碳排放强度指标。

国网衢州供电公司联合当地政府，建立了集能耗数据、经济数据、其他涉碳数据等三类数据为核心的基础数据仓，并在此基础上首创“三维四色”评价模型，从行业先进性、区域贡献度、历史降碳幅度三个维度对标行业基准值，并将企业碳效分为四档，以提供更精准化、差异化的参考依据。



通过综合能源智慧管理平台，让企业的能耗数据一目了然

2.改进流程，“一套规则”明确用能分配

建立预算分配依据：联合政府相关部门，根据企业及行业3年能耗最高值及节能验收报告，确定企业年度用能基数；建设用能预算化管理平台，科学设置预算分配系数，细化能耗指标，将企业用能预算分解到各部门和各生产环节。

设置一键预警功能：通过预算化管理平台的用能实时监测和超限自动预警功能，为企业及时调整用能计划提供数据支撑；同时，帮助企业转让交易用能余量，有效激发市场活力。

开展结果评价应用：助力政府对管控执行到位的企业提供碳金融政策优惠、能源分配倾斜等激励，对执行不到位企业执行用电负荷控制、超用量次年扣减等约束，引导企业加快技改与低碳转型。

3.降碳降本，“一个平台”保障数智管控

结合企业生产工艺流程，国网衢州供电公司定制开发全品类能碳数字化管理平台，通过企业厂区、产线、设备级的用能在线监测，精准找到企业节能减碳点，给出科学的节能技改方案。

基于明旺乳业碳账户的成果，国网衢州供电公司开发“绿能+节能+储能”EMC（合同能源管理）模式，同时为企业寻找政策、资金支持等增值激励，边“省”边“贷”，降低企业降碳成本，一批企业已建成EMC模式。

绿能直供方面：出资为明旺乳业建设8MW分布式光伏及480kW/880kWh储能系统，配套开发智慧光储一体化微网管理平台，降低其年用电成本120余万元。

节能增效方面：及时调整生产与用能计划，开展设备改造，每年综合用能成本降低500万余元。

“增值”激励方面：EMC项目让企业获取绿色减碳贷款1700万元，利率较基准利率下浮80个BP。



多重价值

1.环境效益

明旺乳业自建立碳账户起至2024年，累计减碳总量达11801.44吨，成为国家级绿色工厂；截至2024年底，衢州规上企业碳账户覆盖率达100%，覆盖4067个法人主体。

“十四五”期间，全市碳排放强度下降约19%，实现碳减排约700万吨，区域清洁能源使用比例提升约5%。

2.经济效益

助力银行伙伴开发基于碳账户的金融工具，将企业碳账户评级与绿色信贷、利率优惠、财政补贴挂钩，扩大“碳账户贷”覆盖面。2024年，衢州市发放碳金融贷款1000亿元，累计帮助企业降低融资成本、物流成本、用能成本等共13.2亿元。衢州市的贸易伙伴增至205个国家和地区，出口规模突破500亿元大关。

3.社会效益

目前，衢州已建立工业、农业、能源、建筑、交通、居民生活、林业碳汇七大领域的碳账户共计239.6万个。政府使用企业碳评价作为能源优化配置的依据，优先保障低碳企业能源需求，2024年47家低碳企业增加用能预算209.3万吨标煤，有效推动能源要素高效倾斜，引导高值低耗产业发展。



应用场景

高耗能地区政府、高耗能企业、高能耗园区及其供应链、产业链

About “GoldenKey – SDG Solutions”

To implement the assertion that sustainable development is the “golden key” to solving current global problems proposed by Chinese President Xi Jinping and to respond to the Decade of Action, “GoldenKey – SDG Solutions” (GoldenKey) was launched by China Sustainability Tribune in October 2020. The initiative aims to identify, shape, and promote outstanding corporate SDG solutions in China, tackle humanity's greatest challenges and drive sustainable development in China and beyond. In 2021, the GoldenKey was selected as the UN Good Practices (#33560).

As one of China's most influential platforms for sustainable development, GoldenKey has been held for six consecutive sessions. A total of 2,365 corporate SDG solutions have been collected, with 1,054 selected as outstanding SDG solutions. These solutions span areas such as climate action, well-being for all, rural vitalization, tech4SDG, quality education, action4nature, and zero waste. They stand out for their clear problem definition, outstanding innovation, strong replicability, and significant integrated value, demonstrating the capability and innovation of Chinese enterprises in advancing the SDGs.

With the growing emphasis on green and low-carbon transformation, the number of climate-related corporate solutions featured on the GoldenKey platform has increased each year. Participating enterprises range from central state-owned enterprises and foreign-invested companies to private enterprises of all sizes and sectors, contributing to China's carbon neutrality goal through efforts in energy transition, low-carbon production and operations, digital empowerment, financial support, as well as low-carbon consumption and living. GoldenKey has become one of China's most influential and internationally recognized platforms for corporate sustainability exchange and evaluation.

From 2022 to 2025, GoldenKey and State Grid Corporation of China (SGCC or State Grid) co-hosted the “GoldenKey · SGCC Special” for four consecutive years. The event collects innovative solutions on topics such as low-carbon transformation and green grids, and has identified and promoted numerous exemplary practices within the power sector. In 2025, GoldenKey launched the “GoldenKey · Power Sector Special” in partnership with the China Electricity Council (CEC) to further collect and showcase breakthroughs by power enterprises in climate change, China's 30·60 Decarbonization Goal, and low-carbon transition of clean energy.

GoldenKey continues to optimize and upgrade China's corporate SDG solutions. Through a series of initiatives, including publications, academic forums, field research, international launches, and demonstration projects, GoldenKey showcases and promotes these solutions on domestic and global platforms such as the China International Import Expo, China International Consumer Products Expo, UN Climate Change Conferences, and IUCN World Conservation Congress. This provides replicable models for more regions worldwide and supports the implementation of the SDGs.

Additionally, GoldenKey and the International School of Low-carbon Studies of Shandong University of Finance and Economics jointly established the GoldenKey Low-Carbon Action Center. Focusing on empowering enterprises in their green and low-carbon transformation, the center provides comprehensive knowledge empowerment and capacity building, covering low-carbon strategy development, carbon management capacity building, green project implementation, application of green financial instruments and climate risk control.



GoldenKey Annual Event

关于“金钥匙——面向SDG 的中国行动”

为落实中国国家主席习近平关于“可持续发展是破解当前全球性问题的‘金钥匙’”论断，响应联合国可持续发展目标“行动十年”计划，《可持续发展经济导刊》于2020年发起“金钥匙——面向SDG 的中国行动”（简称“金钥匙”）。

“金钥匙”旨在寻找、塑造、推广来自中国企业贡献SDG的优秀解决方案，应对人类所面临的重大挑战，为推动中国和全球可持续发展贡献力量。2021年，“金钥匙”获评联合国SDG 优秀实践（编号：SDG Action#33560）。

“金钥匙”是中国可持续发展领域具有重要影响力的平台型活动，目前已成功举办六届，共征集了2365项行动，其中1054项行动脱颖而出，在气候行动、人人惠享、乡村振兴、科技赋能、优质教育、礼遇自然、无废世界等领域涌现出一批问题定义精准、创新性突出、可复制性强、综合价值显著的SDG 解决方案，展现出中国企业贡献SDG 的行动力和破解难题的创新力。

随着企业对绿色低碳转型重视程度的增加，金钥匙平台上关注气候议题的企业行动数量逐年增加，涉及企业包括不同规模、不同行业的央企、在华外企以及民营企业等，这些行动分别从能源转型、低碳生产与运营、数字化赋能、金融支持、低碳消费与生活等方面积极参与全球气候治理，贡献中国碳中和目标。“金钥匙”成为中国最具影响力和国际化的企业可持续发展交流与展示活动。

2022-2025年，金钥匙与国家电网连续四年合作举办“金钥匙·国家电网主题赛”，围绕低碳转型、绿色电网等议题征集创新方案，发掘推广了一批行业示范实践；2025年，金钥匙与中国电力企业联合会启动“金钥匙·电力行业主题赛”，旨在更广泛征集推广电力行业在应对气候变化、服务“双碳”目标、促进能源清洁低碳转型等方面的突破性行动。

“金钥匙”持续对中国企业SDG 解决方案进行优化升级，举办成果出版、学术研讨、走访调研、国际发布、推广示范等一系列活动，在中国国际进口博览会、中国国际消费品博览会、联合国气候变化缔约方大会、世界自然保护大会等国内外平台上展现和推广中国企业SDG 解决方案，为全球更多地区提供可复制的经验，助力联合国2030可持续发展目标落实。

此外，“金钥匙”还联合山东财经大学中国国际低碳学院成立“金钥匙低碳行动中心”，以推动企业绿色低碳转型为核心，提供涵盖低碳战略制定、碳管理能力提升、绿色项目实践、绿色金融工具应用及气候风险管控等全方位的知识赋能和能力建设。



金钥匙年度盛典



Read the full version of 2025 Climate Solutions from
Chinese Enterprises
获取《中国企业应对气候变化解决方案》完整案例集



Learn more about GoldenKey SDG Solutions
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“金钥匙——面向SDG的中国行动”



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