Energy Efficiency First, Digital Enablement, Green Power

Decarbonization Levers and Priority Roadmap at ZhongKe (Guangdong) Refinery & Petrochemical Co., Ltd.



Production Optimization and Energy-Saving and Carbon-Reduction Upgrades

Equipment Operation Optimization · Furnace Optimization · Steam Pressure Reduction · Hot-water System Optimization · Cascade Utilization of Circulating Water, etc.

72 Measures implemented	**261.2** Fuel gas saved (t)	**19.4** Steam saved (t/h)
4000 Circ. water saved (t/h)	**607.57** Monthly Electricity saved (10k kWh)	**10** CO_2 cut(10k t)



Energy Efficiency Leaders: Five units—the atmospheric and vacuum distillation unit, hydrocracking unit, continuous reforming unit, diesel hydrogenation unit, and 35PP unit—have been awarded the title of "Energy Efficiency Leader" by Guangdong Province for three consecutive years.

Priority 2 Digital Enablement of Energy Gains

中国石化 SINOPEC

Digitalization: Breaking Manual Limits

Manual tracking hits limits — pump stops, reflux ratios, steam letdown need real-time system computation.

→ **Timely response, amplifying savings**





Sequence: Efficiency First, Green Power Next

Efficiency: every kWh/t steam saved = certain CO_2 cut

No external procurement; benefits stay in-house

Green power: CO_2 cut depends on grid factor

Currently, green electricity purchased from outside Guangdong Province cannot be used to offset carbon emissions.

Maximize efficiency first, then cover remaining power needs with green electricity.

Distributed PV in Operation; Purchased Green Power Share Rising

22.37 MW on-site PV grid-connected · 2025 purchased green power 169M kWh (11% of purchased)

22.37	**1.69**	**0.64**
On-site PV capacity (MW)	green power (100M kWh)	PV equivalent coal (10k t)
5208	**11**	**3.32**
Cumulative PV gen. (10k kWh)	Green power share (%)	CO_2cut (10k t)



Green Power: on-site PV has moved from construction to daily operation; purchased green power from pilot to normal.

Biomass and Sludge Co-firing: Solar + Biomass Fuel Mix

Boilers: Biomass Co-firing Replacing Coal

Continue to implement the co-firing of biomass in power boilers. In 2025, 43,500 metric tons of biomass will be co-fired, bringing the cumulative total to 104,500 metric tons, replacing 83,600 metric tons of coal and **resulting in cumulative carbon dioxide emissions reductions of approximately 162,500 metric tons.**



Waste-to-Resource: Dried Sludge Co-firing

A total of 2,440.46 metric tons of sludge was co-incinerated as a biomass feedstock, partially replacing coal consumption. This synergy resulted in savings of over 900,000 yuan in external disposal costs, achieving a synergistic effect between “waste reduction, resource recovery, and harmless disposal” and carbon reduction.



Solar + Biomass: a low-carbon fuel mix winning on both carbon and cost.

Policy Requests

Green Power Consumption & Carbon Offset

Status: The company participates in Guangdong Province's pilot carbon market while facing pressure to expand into the national carbon market; the proportion of purchased green electricity has been increasing year by year.

Request: Introduce detailed accounting rules, streamline the process for certifying emissions reductions, and boost companies' enthusiasm for purchasing and using green electricity

CO_2 Resource Utilization

Practice: The ethylene oxide plant supplies 100,000 metric tons of CO_2 per year to enterprises in the industrial park for the resource-efficient utilization of food-grade carbon dioxide.

Request: Clarify the rules for verifying the compliance of emission reductions resulting from the resource-based utilization of such resources, and include them in the carbon market's recognized emission reductions.

