

Status of Energy Consumption

I. Energy Management

The type of energy used by TSRC's production sites mainly includes natural gas, liquefied petroleum gas, diesel, steam, and electricity. TSRC no longer uses coal after phasing-out two coal-fired boilers in Nantong Industrial in the end of 2020. The Kaohsiung factory completed the adjustment of boiler fuel in the same year and completely replaced oil with natural gas. The group no longer uses fuel oil as well. At the same time, in 2021, we began using waste gas and waste for energy recovery, including flare and VOCs. We also recycle butadiene and styrene, not only cutting GHG emissions from the use of primary petrochemical fuel but also reducing the potential negative environmental impact of air pollutants released in the manufacturing process.

TSRC achieved the certificate of ISO 50001 Energy Management Systems and adopt it to periodically analyze energy use and consumption of main production sites. We also established energy performance indicators to monitor major energy consumption areas. This will improve our energy efficiency and reduce energy consumption, and we will continue to improve production processes and replace equipment to achieve energy management goals. In recent years, all subsidiaries have established ISO 50001 Energy Management Systems to check performance in order to improve the energy efficiency of factories. Among them, the Kaohsiung factory has received the ISO 50001 certificate. For high energy consumption sites such as the Kaohsiung factory and Nantong Industrial, we will continue to review energy performance work plans, implement energy conservation measures, and regularly review operation outcomes.

TSRC total energy consumption in 2021 was 5,156,524,089 million joules, decreasing 1.24% compared to 2020. TSRC's energy intensity per unit of production has declined for three consecutive years since 2019, reaching 9,173 million joules per metric ton of production in 2021, decreasing 8.38% compared with the previous year.

II. TSRC Group's Energy Consumption in the Past Three Years

Unit: Million Joule		2019	2020	2021
Consumption (Non-renewable energy)	Black coal	1,510,519,874	1,179,652,248	0
	Fuel oil	22,804,398	22,762,089	0
	Diesel in factory area	9,551,193	14,775,473	5,283,020
	Natural gas	1,685,903,497	1,621,896,169	1,822,886,213

Unit: Million Joule		2019	2020	2021
	Liquefied petroleum gas	6,393,279	4,161,604	1,824,435
	Gasoline	1,174,120	1,070,078	1,415,253
	Recycled butadiene	47,540,131	53,400,506	59,917,153
	Subtotal	3,283,886,491	2,897,718,167	1,891,326,762
Indirect Energy Consumption	Purchased electricity	869,032,800	921,085,200	975,172,600
	Purchased steam	1,530,006,440	1,402,533,400	2,290,025,727
	Subtotal	2,399,039,240	2,323,618,600	3,265,197,327
Total energy consumption		5,682,925,731	5,221,336,767	5,156,524,089
The percentage of grid electricity to total energy consumption		15%	18%	19%
Note: 1. Total energy consumption of the organization is calculated as Direct energy (non-renewable energy) consumption + Consumption of purchased electricity and steam. 2. Calorific value conversion factor used for each type of energy: Black coal 5,600 kcal/kg, fuel oil 9,600 kcal/L, diesel 8,400 kcal/L, natural gas 8,000 kcal/m ³ , liquefied petroleum gas 6,635 kcal/kg, gasoline 7,800 kcal/L, and recycled butadiene 7,800 kcal/L. 3. All factories of the TSRC no longer use coals and fuel oil from 2021. 4. The 2019 and 2020 data are restated due to changes in data and parameters. 5. The data is calculated with higher heating values (HHV).				

III. Key Energy Conservation Measures and Results of TSRC Business Locations in 2021

Location of operations	Key energy conservation measures	Energy conservation benefits (annual energy saving)
TSRC (Shanghai)	Replacing diesel forklifts with electric fork lifts	224GJ
	Replacing equipment with energy-saving electrical equipment	1.17GJ
ShenHua	Recycling hot wastewater for heating rubber latex	3000 tons of steam per year

Location of operations	Key energy conservation measures	Energy conservation benefits (annual energy saving)
Chemical	Water circulation system lift pump modification	900,000 kWh per year
	Changing non-inverter motors with high energy consumption into inverter motors	150,000 kWh per year
TSRC (Nantong) & TSRC (UBE)	Changing the pilot light for production equipment from liquefied petroleum gas to natural gas	1172 GJ Note: Saved 40 tons of standard coal per year, and calculated using one ton of standard coal equal to 29.3 GJ
	Replaced the steam pipes for SEBS and SIS production lines from rock wool to aluminum silicate wool to reduce thermal loss	8,790 GJ of thermal energy from steam Note: Saved 300 tons of standard coal per year, and calculated using one ton of standard coal equal to 29.3 GJ