

Energy Efficiency in Production

OVERVIEW

As a manufacturing company producing four product segments - Tiles, Sanitaryware, Faucets, and Tableware - we acknowledge our significant energy intensity and the pivotal role we play in energy conservation and climate change mitigation. Consequently, we prioritize efforts to reduce our energy consumption by investing in technologies that enhance the energy efficiency of our production processes.

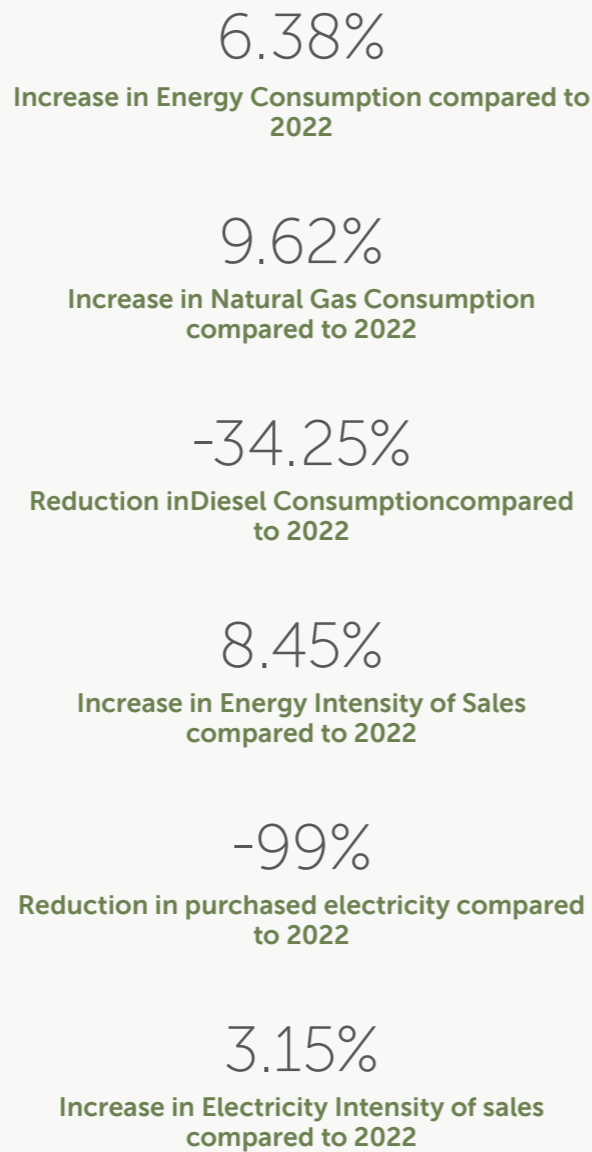
We implement multiple environmental initiatives to enhance energy efficiency and reduce our environmental footprint. Firstly, we operate two cogeneration plants with gas turbines, maximizing efficiency by utilizing exhaust air for ceramic spray dryers, thereby significantly reducing natural gas consumption and emissions. Secondly, we recover thermal energy from roller kilns using a heat recovery system, minimizing energy loss through flue gas and cooling gas exhaust stacks. Additionally, we piloted replacing chillers with cooling towers to decrease power consumption, and we have upgraded our power plant by replacing heavy fuel oil engines with natural gas engines, reducing carbon emissions and increasing on-site electricity generation. These efforts collectively contribute to our commitment to sustainability and energy conservation.

Between 2022 and 2023, our energy consumption witnessed a 6.38% increase from 6.52 PJ to 6.94 PJ, while our energy intensity of sales increased by 8.45% from 1.86 GJ / 000 AED to 2.01 GJ / 000 AED. The increase in energy consumption is owing to several factors, but the major factor is related to the change in product mix, with more volumes of GP tiles being produced due to market demand.

GP tiles are more energy and water resource intensive to produce. In 2023, RAK UAE achieved its highest-ever GP production of 28.20 million M2, with a Red Body:GP ratio of 43:57, leading to an overall increase in energy consumption. This shift in production necessitated the closure of certain plants, resulting in a 36.4% reduction in dry milling production and subsequent impacts on power and gas usage. Additionally, the increased thickness of GP tiles by 33% has led to higher gas consumption in the GP production process.

A new frit manufacturing plant is being set up in order to reduce consumption of imported frits from different regions by in-house manufacturing through locally available raw material and material from neighbouring countries. This will be a step further towards sustainability by increasing utilization of locally available raw materials and reducing CO2e due to reduction in imported frits.

Going forward, from 2024 onwards, we will continue to place a high focus on reducing the resource intensity of GP tiles production, given the market shift. This will cement our place a dynamic sustainability leader.



Initiatives for 2023

We are currently upgrading our procedures and policies, and in 2023, we aim to achieve the ISO 50001 certification.

TILES PRODUCTION

As one of the largest tile producers in the world, we recognize our responsibility to take active efforts to reduce our emissions and contribute to climate action.

Numerous energy efficiency initiatives have been integrated into our tile production operations to optimize resource usage and reduce environmental impact. These include the application of refractory coatings on thermal vessels to lower ambient temperatures and enhance heat absorption, as well as the implementation of auto air regulators and oxygen analyzers to ensure efficient combustion and minimize energy losses. Vulcan burners and fuel-saving catalysts have been deployed to improve fuel burning efficiency, while X-Plate technology facilitates more effective combustion within furnaces.

Despite maintaining consistent fuel intensity for GP in 2021-22, a 10% increase was observed in 2022-23, attributed to changes in product mix, market shift towards increased GP production and optimization activities.

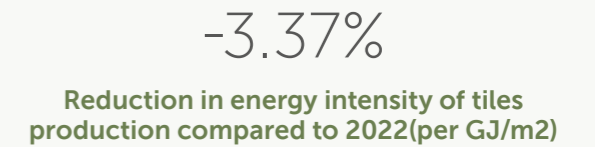
In 2023, focusing our efforts for sustainable operations, we executed 32 projects resulting in significant fuel and energy consumption reduction. These projects saved us 17,700 MMBTU fuel and 301,000 kWh. One of our biggest initiatives in 2023 was the setting up of a new, smart, and efficient manufacturing unit (Plant 2) which gave us a productivity boost of 16%, reducing its power consumption by 5% and gas consumption by 7.2%.

Across all our plants, multiple initiatives were undertaken in order to improve sustainability in our current operations and for 23 such key initiatives undertaken in 2023 we invested close to 15.17 millio.

Looking ahead, 14 additional initiatives are planned for 2024 to further enhance energy efficiency. Moreover, the establishment of smart factory operations and the conversion of red body sizing from wet to dry milling processes demonstrate our ongoing commitment to reducing power, gas, and water consumption while increasing productivity and sustainability across our operations.

Specific initiatives to reduce energy include setting up smart factory operations, which included the installation of new production facility with single line operation. Productivity increased by 16% compared to 2018 capacity. This resulted in reduction in power and gas

consumption by 5.05% and 7.22% respectively. Another initiative we undertook to reduce power and gas as well as water was conversion of red body size from Wet Milling process to dry milling process which will continue into 2024.



POWER SAVINGS



THERMAL SAVINGS



Energy Efficiency in Production (contd.)

SANITARY WARE PRODUCTION

We are committed to becoming a leader in the industry with regards to bathroom solutions that are innovatively designed, are of high-end quality, and sustainably produced.

In 2022, we explored and implemented several initiatives to support reduction in power consumption. These include development of silicon carbide setters to improve volumetric efficiency, piloting ANCORA burners to reduce gas consumption, use of our patented technology – X-plates, and investing in several modifications for our equipments such as for dust collectors, spray booth, capacitor bank and pre-dryers.

In 2023, we scaled our efforts towards sustainable operations and undertook several initiatives to reduce our power consumption. Our biggest initiatives were our investment in one of the largest tunnel kilns in the industry and the retrofitting of some of our kilns with the latest technologies to reduce fuel consumption.

Other initiatives to reduce power consumption include, SMART controlled compressors, VFD installations & modifications, dust collector integration, energy efficient motors, blowers for casting, smart ceiling fans and dust collectors. We undertook several in-house modifications and fabrications of equipment such as for setters, control panels, conveyors, mold sensor support, regulators, moulding plates, slip tanks, motors and casting machines to improve productivity of production processes and energy consumption.

As a result of the aforementioned initiatives, we saw significant results in 2023. The energy intensity of sales (GJ / 000 AED) reduced by 20.46%. Our gas consumption reduced by 2.24% per unit. Another major achievement we achieved in 2023 was the electricity savings experienced in our compressors. Between Jan and Dec 2023, energy consumption in air compressors fell by nearly half. However, our overall energy consumption (GJ / unit) increased by 1.26%. This increase was largely due to base load operations that were required while adjusting to lower market demand.

-20.46%

**Reduction in energy intensity of sales
(GJ / 000 AED)**

1.26%

**Increase in energy intensity of production
(GJ / unit)**

-2.24%

**Reduction in fuel consumption per unit
(MMBTU / unit)**

FAUCETS PRODUCTION

Amidst a significant expansion in production capacities and notable productivity enhancements in chrome production, RAK Ceramics has successfully upheld similar power consumption levels and reduced energy intensity.

Despite a substantial increase in production capacities, with output rising from 0.5 million to 1.5 million units and producing 3000 pieces in 10 hours compared to 1600 previously, RAK Ceramics has managed to maintain similar power consumption levels at this elevated scale of production.

Additionally, improvements in chrome production productivity were achieved. These collective efforts resulted in an impressive 48.78% reduction in the energy intensity of faucets production, reflecting our commitment to enhancing energy efficiency while scaling up operations.

1.88x

**Increase in output of pieces per hour
compared to 2022**

-48.78%

**Reduction in energy intensity of
production compared to 2022**

TABLEWARE PRODUCTION

In 2023, RAK Ceramics achieved significant reductions in energy intensity within its tableware production.

There was a notable decrease of 2.84% in the energy intensity of tableware sales and a 6.31% reduction in the energy intensity of tableware production processes. To further enhance energy efficiency, we initiated the installation of Variable Frequency Drives (VFD) on 34 machines and equipment, a project initiated in 2022.

This endeavor resulted in a commendable 1.69% reduction in electricity consumption, contributing to our ongoing efforts in sustainability and resource efficiency.

-7.02%

**Reduction in fuel consumption per unit
compared to 2022**

-2.84%

**Reduction in energy intensity of sales
compared to 2022**

-6.31%

**Reduction in energy intensity of
production compared to 2022**