ISO 50001 Energy Management System – Case Study

2024 Türkiye

Henkel Ankara Plant

"One-third energy savings over a five-year period."

The Energy Team in Solar Opening Ceremony

Case Study Snapshot	
Industry	Chemical
Product/Service	Laundry & Home Care and Hair
Location	Ankara / Türkiye
Energy performance improvement percentage (over the improvement period)	32 % improvement over 5 years
Total energy cost savings (over the improvement period)	USD 904,330
Cost to implement Energy Management System (EnMS)	USD 2,733,500
Total energy savings (over the improvement period)	12,690 MWh
Total CO_2-e emission reduction (over the improvement period)	3,820 Metric Tons

Organization Profile / Business Case

Global climate change is one of the greatest challenges, humanity is facing today, requiring urgent and ambitious action. It is also critical to protect and regenerate our resources and life-support systems like forests, water and biodiversity, for present and future generations. At the same time, we are seeing global poverty and social inequality increase, which in turn jeopardizes human rights and the basis of social coexistence. We acknowledge that companies like Henkel play a role in meeting these challenges and bringing about transformational change.

Henkel is one of the leading companies in consumer and industrial markets. Our portfolio includes familiar brands for hair and body care, detergents and cleaners, as well as adhesives, sealants and functional coatings.

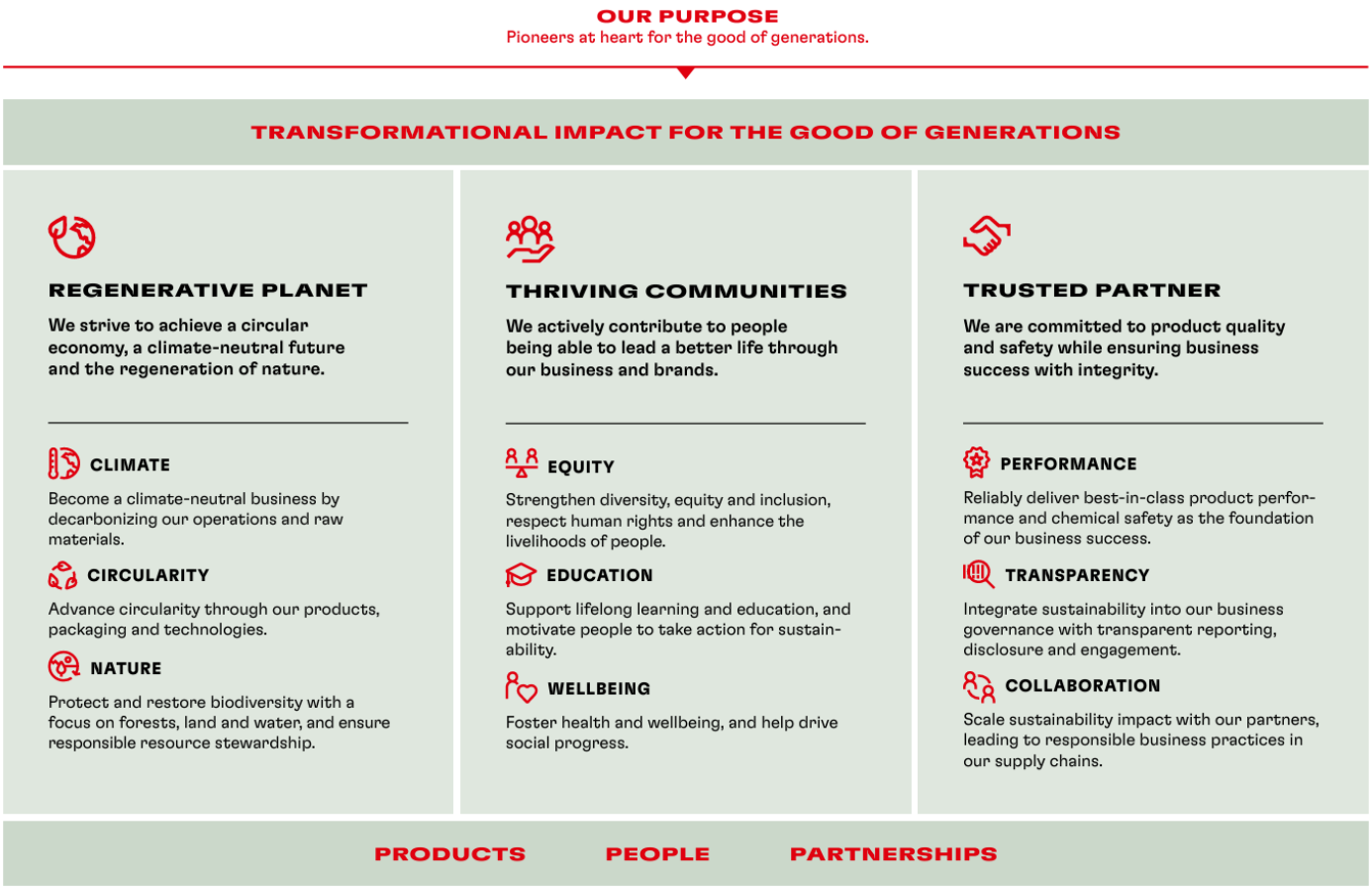
Henkel Ankara focuses on the global business areas of Laundry & Home Care and Hair.

Our sustainability strategy is a direct reflection of our company's commitment to "Purposeful Growth." We are committed to driving transformational change by creating more value for our stakeholders, developing our business successfully, and acting sustainably for the benefit of current and future generations.

Implementing ISO 50001 Energy Management System(EnMS) directly aligns with Climate Targets and Ambitions under the Regenerative Planet Purpose.

ISO 50001 Energy Management System – Case Study

2024 Türkiye



The table below shows the targets and ambitions to advance sustainability transformation. While the ambitions generally embrace a long-term time horizon, we define them in concrete terms by setting medium-term and measurable targets. Each facility within Henkel establishes EnMS objectives and energy targets as part of our commitment to contributing to Climate Targets and Ambitions. This formal process ensures that we align our energy management strategies with broader sustainability goals, enabling us to effectively reduce our environmental impact and support global efforts to address climate change.

Topic	Targets and ambitions	Achieved 2023	Trend [1] (vs. 2022)
Climate	Climate-positive operations (2030)	Ambition	
	100 % of our electricity sourced from renewable sources (2030)	89 %	↗
	– 65 % CO_2 emissions from our production per ton of product (2025; vs. 2010)	– 61 %	↗
	– 30 % CO_2 emissions from raw materials and packaging per ton of product (2030; vs. 2017)	– 17 % [3]	↗
	– 100 million tons of CO_2 with customers, consumers and suppliers (2016–2025)	>89 million	↗
	Net-zero pathway development for Scope 3 emissions	Ambition	

[1] Direction of arrow indicates trend to target, regardless of numerical significance. No trend is shown for targets that are being reported here for the first time or for ambitions.

ISO 50001 Energy Management System – Case Study

2024 Türkiye

Henkel's Ankara facility stands out as a leading entity within the group, having internalized energy management and fulfilled all necessary practices. This positioning enables the facility to successfully achieve its energy efficiency and sustainability objectives. Besides that, Henkel's Ankara facility has a Voluntary Agreement with the Turkish Ministry of Energy and Natural Resources. According to the agreement, Henkel Ankara should reduce specific energy consumption by 10% within 3 years. The agreement started in 2022, and annual reports are sent to the Ministry every March. At the end of the agreement, it is planned to receive 30% of energy costs of last year as a grant.

"Through our commitment to ISO 50001, Henkel has not only achieved operational excellence but also paved the way for sustainable success, demonstrating our dedication to energy efficiency, environmental responsibility, and continuous improvement."

—Dr. Dirk Holbach, CSCO @ Henkel Consumer Brands

Business Benefits

Henkel Ankara Plant achieved ISO 50001 certification in 2018 and has since made significant strides in energy efficiency and sustainability. Over the span of five years, we successfully reduced our energy consumption by one third compared to our 2018 baseline. This accomplishment not only aligns with our sustainability targets but also enables us to qualify for energy efficiency incentives in Turkey, resulting in approximately $100,000 in incentives realized through our certification.

Our commitment to energy efficiency is evident in the substantial investments made, totaling nearly $2.75 million in various projects. These initiatives have yielded significant cost savings of approximately $1 million and contributed to the avoidance of around 4,000 metric tons of CO2 emissions over the five-year period. Notably, our efforts extend to renewable energy adoption, with the installation of a solar power plant on our roofs generating approximately 12% of our total electricity consumption.

To effectively track our energy performance, we utilize a normalized approach by referencing the energy consumption data from our baseline year (2018) against variables such as production volume and heating degree day (HDD) for Ankara. This methodology allows us to calculate expected energy consumption on a monthly basis and compare it with actual consumption, facilitating targeted analysis and root cause identification for any deviations in performance.

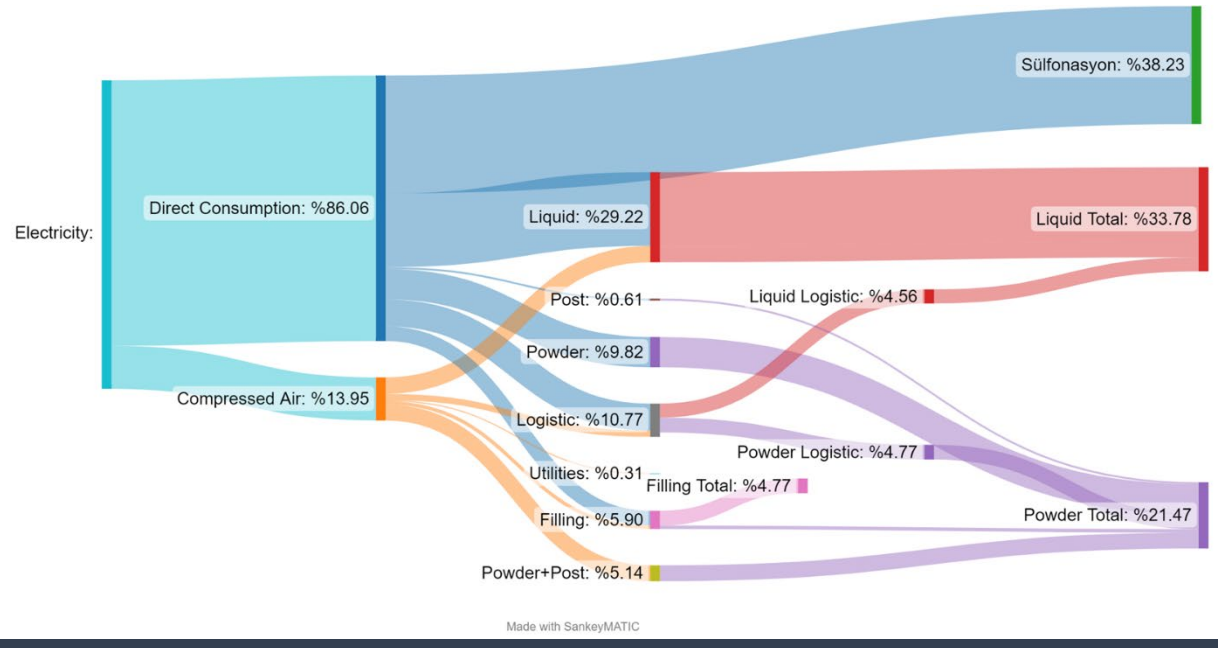
The transition to the EN ISO 50001:2018 revision has been instrumental in refining our energy performance tracking. We have moved away from specific energy consumption metrics, which were not objectively reflective of different production types, to a more comprehensive and accurate system that enables us to pinpoint areas of improvement effectively.

Our focus on significant energy users, such as the spray dryer accounting for 55% of natural gas consumption, underscores our commitment to optimizing energy-intensive processes. We conduct daily problem-solving sessions and utilize computational fluid dynamics (CFD) analyses to enhance energy efficiency and identify optimization opportunities. Furthermore, our energy team's activities have extended beyond energy management to influence other ISO standard activities. Our energy bulletin serves as a communication tool within the organization, fostering awareness among staff members and promoting environmental stewardship. Our initiatives have also garnered attention from other plant teams, leading to collaborative discussions on similar projects, such as CFD analysis for tower optimization.

Plan

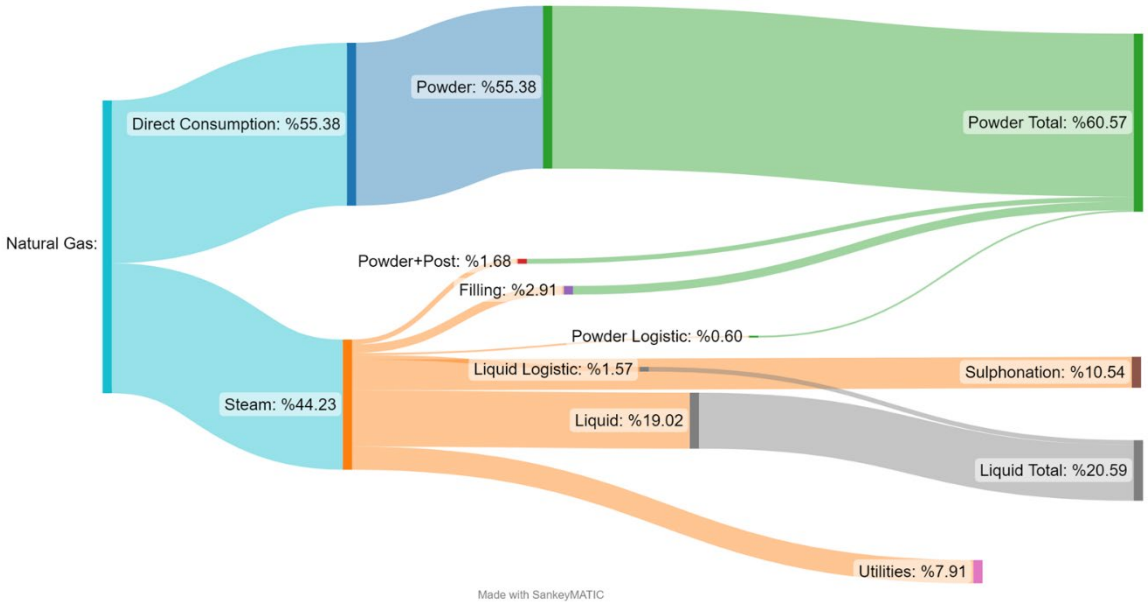
Henkel has set ambitious sustainability targets, aiming for 100% renewable energy by 2030 and zero carbon emissions by 2040. To secure the commitment of decision-makers, we meticulously crafted a strategic approach:
Strong Business Case with Data: We presented a robust business case supported by data, meticulously illustrating the efficiency gains and direct alignment with Henkel's sustainability objectives. This comprehensive approach demonstrated the tangible benefits and strategic value of our initiatives.
ROI Demonstrations: Through showcasing the return on investment (ROI) achieved in past projects, decision-makers gained a clear understanding of the financial benefits and long-term viability of sustainability endeavors. These demonstrations fostered trust and confidence in our sustainability strategies.
Monthly Energy Performance Reports: Our energy team consistently delivered detailed monthly reports on the energy performance of significant users. These reports meticulously outlined energy and cost savings resulting from our initiatives, providing decision-makers with transparent insights into the tangible impacts of our efforts.
By integrating these formal strategies, we successfully garnered the commitment of decision-makers, ensuring steadfast support and resources for our sustainability journey toward Henkel's ambitious targets.
Our top management played a crucial role in the implementation process by providing strategic direction, support, and resources.
Dr. Dirk Holbach's post showcases the proactive involvement of top management in sustainability initiatives at Henkel's Ankara team.
‘’Sustainability…. the Türk Henkel Ankara team is highly committed to raise the bar by setting challenging targets for ourselves in terms of sustainability to hand down a better world to the future generations. …. in line with our vision, we successfully installed 1 MWp capacity solar system which will produce 1400 MWh/y renewable energy. In 2023 we are planning to expand the capacity and reach 3 MWp electricity production which will cover 32% of Ankara plant's annual electricity consumption.’’

Henkel's commitment to sustainability targets facilitates the acquisition of financial resources through detailed project figures. Additionally, we actively pursue financial grants to bolster our financial capabilities. Notably, Energy Efficiency Enhancement projects are eligible for a 30% incentive from the Energy and Natural Resources Ministry, further supporting our sustainability endeavors.



Henkel Ankara Plant comprises three primary production areas: Liquid Production, Powder Production, and Sulfonation Production. Notably, the raw materials produced by the Sulfonation Facility are integral to both liquid and powder production processes.

To effectively analyze energy usage, we have designated significant energy users within our operations. During collaborative sessions with the energy team, we engage in brainstorming sessions illuminated by Sankey Diagrams, aiding in a comprehensive understanding of energy flows.



Furthermore, we utilize a matrix approach to identify significant energy uses and evaluate potential areas for improvement. This methodology, coupled with an ABC Analysis, enables us to prioritize energy efficiency projects effectively.

Potential for energy reduction (e.g. benchmark value)	Category of significance within process or equipment		
	C: <5%	B: 5-10%	A: >10%
C: <5%			
B: 5-10%			
A: >10%			

Legend
- not significant for energy reduction
- low significance for energy reduction
- significant for energy reduction, 1st priority input for the energy program

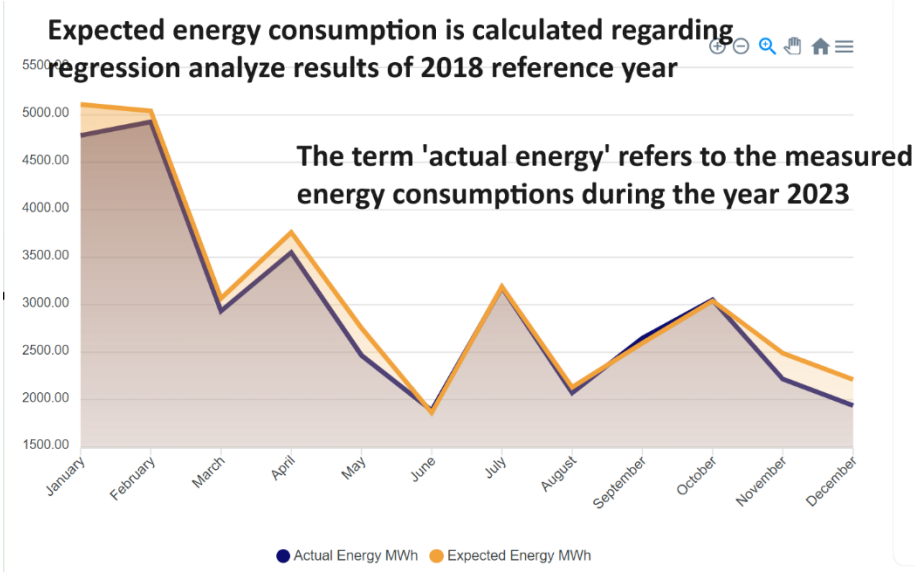
An essential aspect of our energy management strategy involves understanding energy performance trends. As part of this endeavor, we established a reference year in 2018 and conducted regression analysis to discern the drivers affecting energy consumption. This data-driven approach guides our decision-making processes and facilitates continuous improvement initiatives. The regression analyze shown below define our reference line. For Henkel Ankara Plant, energy drivers are defined as Liquid Production, Powder Production, Sulphonation Production and Heating Degree Day(HDD). R square find as 0,985 which is accepted by ISO 50006 to accept variables as significant.

SUMMARY OUTPUT								
Regression Statistics								
Multiple R	0,992596							
R Square	0,985247							
Adjusted R Squ	0,976816							
Standard Error	102795,3							
Observations	12							
ANOVA								
	df	*SS*	*MS*	*F*	*ignificance F*			
Regression	4	4,94E+12	1,23E+12	116,8677	1,74E-06			
Residual	7	7,4E+10	1,06E+10					
Total	11	5,01E+12						
	Coefficients	*andard Erro*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*ower 95,0%*	*Upper 95,0%*
Intercept	781938,6	184113,4	4,247048	0,003807	346579,5	1217298	346579,5	1217298
Liquid	36,40333	16,48278	2,208567	0,06293	-2,57225	75,37891	-2,57225	75,37891
Powder	197,1168	19,40407	10,15853	1,93E-05	151,2335	243,0002	151,2335	243,0002
Sulphanotion	4,574297	169,5572	0,026978	0,97923	-396,365	405,5133	-396,365	405,5133
HDD	2360,644	176,8796	13,34605	3,11E-06	1942,39	2778,898	1942,39	2778,898

P_{energy} = 781.938,6 + Liquid Production * 36,4 + Powder Production * 197,12 +Sulphonation Production * 4.57 +HDD * 2.360,64

On a monthly basis, energy calculations are performed using formulas derived from the 2018 regression analyze. This approach allows us to predict expected energy consumption, which is then compared against actual energy usage. Through this analysis, we aim to monitor and evaluate our energy efficiency performance regularly.

At the end of each year, we strive to achieve the efficiency targets set by top management. These targets serve as benchmarks for our energy management efforts, guiding us toward continuous improvement and alignment with organizational goals. Formalizing this process ensures accountability, transparency, and a structured approach to achieving our energy efficiency objectives.



"ISO 50001 and our Energy Management System are integral to Henkel's success, enabling us to optimize energy usage, reduce costs, and uphold our commitment to environmental sustainability, all while driving continuous improvement across our operations"
—Ozgur Dilmen, Ankara Factory Director

Do, Check, and Act

Following the planning stage, our organization conducts local energy audits and initiates enhancement projects targeting significant consumption areas. Stakeholder input is highly valued throughout this process, ensuring a collaborative approach to finding appropriate and conventional solutions. Upon defining projects, we engage multiple suppliers to explore the most suitable options.

Monthly meetings with top management are pivotal, where all projects are thoroughly reviewed in terms of ROI, life time cost, implementation duration, alternatives, and supplier evaluations. Approved project budgets are released following top management's assessment and approval.

Energy Manager prepares monthly reports on the energy performance of all significant users within the organization. These reports include briefings from responsible individuals for each significant user, explaining any fluctuations. Non-conformities are addressed if the deviation exceeds 10% between expected and actual energy consumption.

Our ambition as a team is to achieve the general energy efficiency target set by top management each year. We understand that reaching this target requires a focus on every significant user, with all project contributions calculated toward the general target.

For each significant user we have different indicators but general indicator is defined by normalization. The table below show the tracking methodology. This table is from 2023 and we achieved general target by %4,3 saving compared to 2018. To calculate expected energy, we use 4 variables which are seen as well in the table.

Different indicators are used for each significant user, with a general indicator defined by normalization. The tracking methodology, as outlined in the table below from 2023, showcases a 4.3% saving compared to 2018, aligning with our efficiency goals.

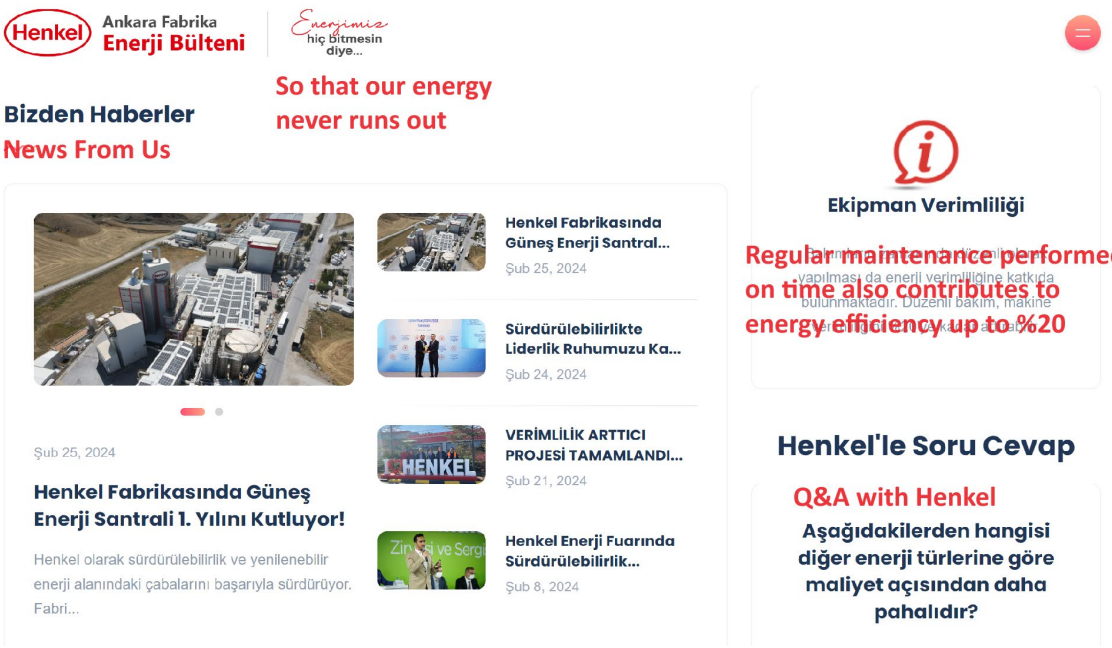
Months	*Production 1*	*Production 2*	*Production 3*	*HDD*	*Actual Energy*	*Expected Energy*	*Saving/ Deviation*	*Saving/ Deviation Ratio*	*Exp. If Deviation>%10*
January	19.311,57	12.415,71	1.973,14	495	4.783.061,70	5.109.833,85	326.772,15	6,4%	
February	19.846,41	12.603,90	2.349,28	441	4.926.339,82	5.040.645,38	114.305,56	2,3%	
March	10.795,19	5.621,02	1.366,93	330	2.932.777,99	3.068.181,59	135.403,60	4,4%	
April	14.694,34	9.485,18	1.900,02	240	3.549.953,55	3.761.795,85	211.842,30	5,6%	
May	17.425,31	5.628,88	1.399,90	94	2.465.853,49	2.754.129,73	288.276,24	10,5%	
June	11.084,28	3.407,81	1.325,34	0	1.886.345,47	1.863.242,11	- 23.103,36	-1,2%	
July	22.389,53	8.027,65	2.190,94	0	3.181.823,79	3.189.399,57	7.575,78	0,2%	
August	13.637,54	4.291,48	1.360,92	0	2.071.676,20	2.130.538,52	58.862,32	2,8%	
September	18.296,60	5.791,79	1.485,15	0	2.648.967,13	2.596.448,17	- 52.518,96	-2,0%	
October	21.209,10	6.853,55	1.950,18	54	3.051.396,54	3.041.366,29	- 10.030,25	-0,3%	
November	13.023,78	3.422,32	1.184,50	234	2.217.278,38	2.488.453,36	271.174,98	10,9%	
December	4.684,63	1.980,78	507,76	367	1.937.170,39	2.211.599,26	274.428,87	12,4%	
Total						37.255.633,67	1.602.989,22	4,3%	

To enhance awareness and communication, we publish an energy bulletin internally, fostering a culture of energy efficiency and encouraging suggestions.

Internal audits are conducted by our internal auditor team, trained annually on ISO standards and customized energy efficiency topics. Additionally, training sessions with suppliers focus on blue-collar employees, ensuring alignment with energy efficiency practices and protocols.

ISO 50001 Energy Management System – Case Study

2024 Türkiye



Transparency

Henkel is one of the leading companies in consumer and industrial markets. Sustainable business practices have been an integral part of our company culture for decades, and are also a central element of our vision of the future. Every year we release Sustainability Reports. https://www.henkel.com/sustainability/sustainability-report

Henkel Ankara Plant is one of the most transparent companies regarding energy efficiency. We participate in many open public competitions in Turkey and receive awards. In Turkey, the company should be certified by ISO 50001 to attend Efficient Improvement Projects, Voluntary Agreements, and Industrial Energy Efficiency Competitions. For this reason, ISO 50001 EnMS activities are among our priorities. We also prepare a monthly energy bulletin for internal transparency.

Voluntary Agreement – 2021

Factories That Produce Energy Award - 2022

Energy Efficiency Competition In Industry – 2023

Efficiency Enhancement Project Grant - 2023

What We Can Do Differently

- We've been tracking our energy performance on a monthly basis, but we've encountered challenges in pinpointing the reasons behind poor energy performance after the fact. To address this, we can consider shifting to daily tracking to identify the root causes of any performance issues swiftly.
- We can increase our opportunities for comparison by matching and comparing energy performance with other Henkel companies in similar processes. Additionally, we could have conducted internal audits mutually with the Henkel company we matched with.
- Energy managers of Henkel factories can conduct periodic meetings to keep track of technology advancements. These meetings can serve as valuable platforms for sharing new developments, innovative technologies, and best practices in the industry. By facilitating information sharing and collaboration among factories, continuous improvements in energy efficiency and management can be achieved.

In the near future, we will implement the above-mentioned initiatives.