

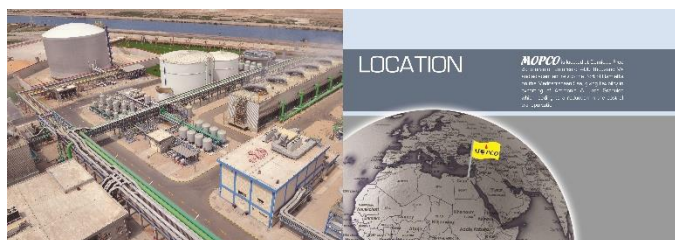
ISO 50001 Energy Management System Case Study

2020

Egypt

Misr Fertilizers Production Company (MOPCO)

MOPCO succeeded to transition to the new version of the International Standard for Energy Management System ISO 50001:2018.



Organization Profile & Business Case

MOPCO, one of the petroleum sector companies, founded in July 26, 1998 according to rules and provisions of the law of Investment guaranties and incentives number 8 issued in 1997 inside the free zone in Damietta on a space that is 400.000 meters square allocated for MOPCO project and the future expansions. This project produces Urea as a main product and liquid. MOPCO Train one that began operating in 2008 and other two Train that began operating in 2015 and 2016 respectively.

Each plant producing approximately 1200 metric tons per day (mtpd) of Ammonia (UHDE technology), 1925 mtpd urea Granulation (Stamicarbon technology).

MOPCO has established an Energy Management System (EnMS) for all Ammonia and urea production process as part of the continuous management support for sustainable improvement for energy and environmental performance all over the time. MOPCO has been proceeded in this project in order to better understand

the key risks and opportunities associated with the use of energy in our operations.

“Successful implementation of EnMS depends on commitment from all levels and functions of the organization, and especially from top management.”

—Hisham Nour El-Dein, CEO

Case Study Snapshot

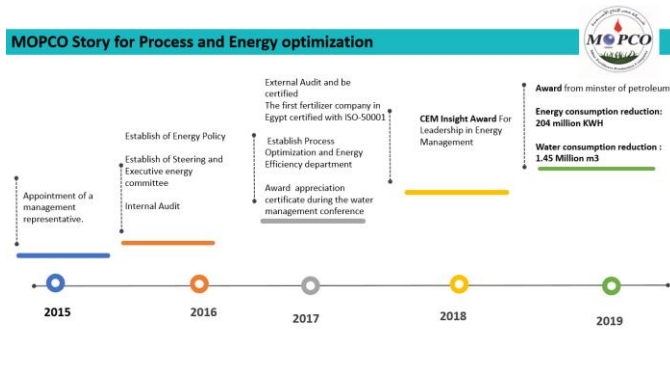
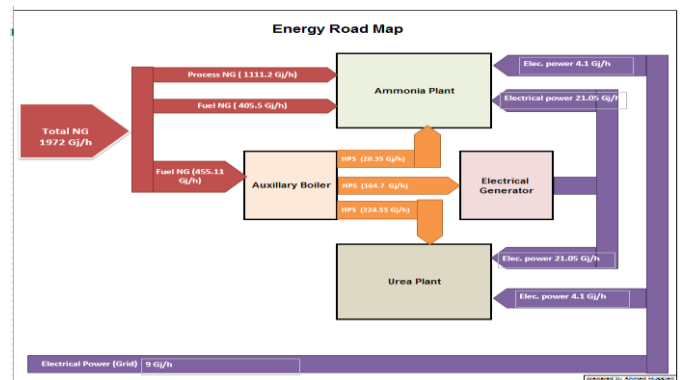
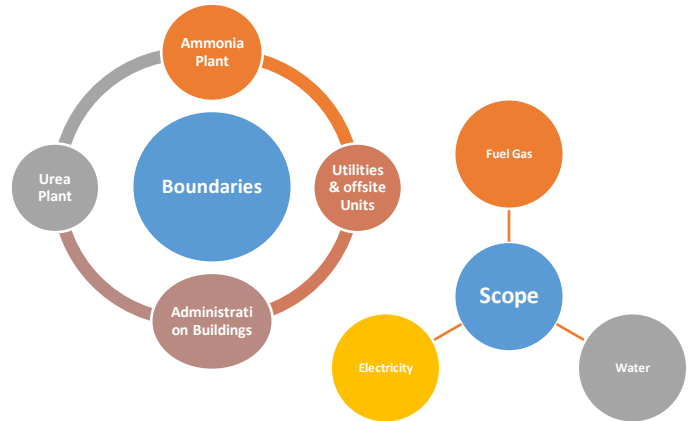
Industry	Chemicals
Product/Service	Urea and Ammonia
Location	Egypt – Damietta free Zone
Energy management system	ISO 50001:2018
Energy performance improvement period, in years	4 years
Energy Performance Improvement (%) over improvement period	11.7 % (2.9% per year)
Total energy cost savings over improvement period	3,992,896 \$USD
Cost to implement EnMS	1.5 Million \$USD
Total Energy Savings over improvement period	1,533,272 Gj
Total CO ₂ -e emission reduction over improvement period	212,614 Tons

Business Benefits

The implementation of the Energy Management System according to ISO 50001 has improved the energy performance from 2016 to 2019 in 11.7 % regarding the baseline defined. The total energy saving is 425,909 MWH. The saving reached during the period 2016-2019 is of about 4 Million USD.

Indirect benefits:

- Awareness of the staff about the importance of the energy rational use.
- Participate all the organization levels to improve work efficiency.
- Improve the management of energy saving and consumption reduction.
- Form a mechanism with a variety of management means, and improve the overall effect and efficiency of energy conservation work.

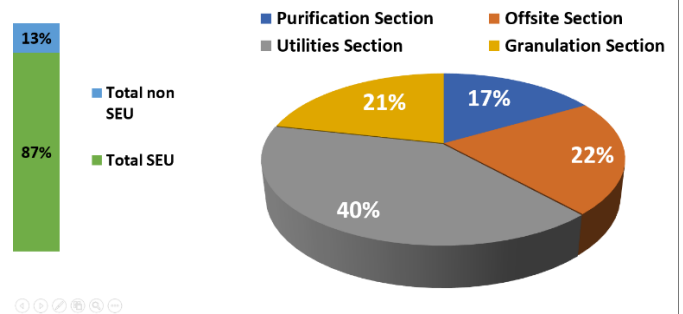


Plan

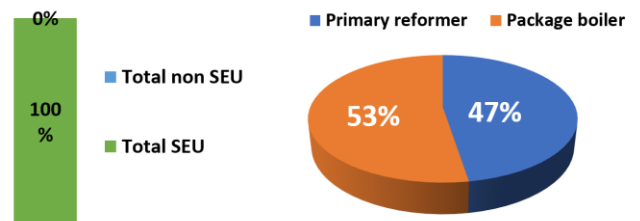
Every Three years MOPCO makes plan for overall deployment of energy saving and water saving. At the beginning of each year, we review the energy balance, Scope , Boundaries and SEUs’.

MOPCO top management realized that the best approach for implementing an effective EnMS is by appointing energy management representative , establishing steering energy committee directed by chairman production and establishing executive energy committee.

Significant Energy users for Electricity



Significant Energy users for Fuel Gas



“Implementing an energy management system is the easiest way to increase profit”

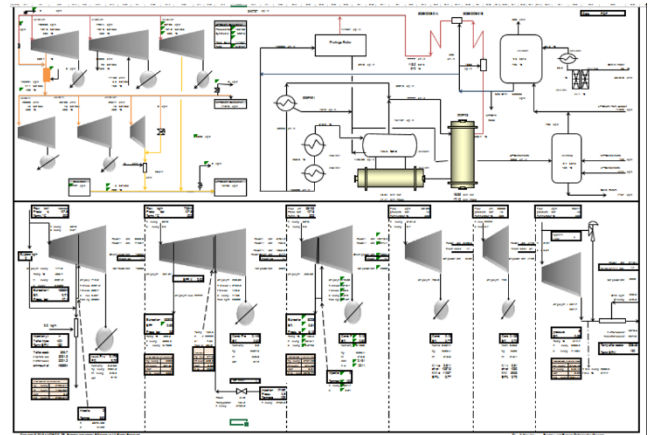
— Hisham Nour El-Dein, CEO

deviation from the performance plant test by Uhde, Calculating all the plants energy and money losses regarding this deviation and Planning short term and long terms plans to eliminate and to adjust this deviation.

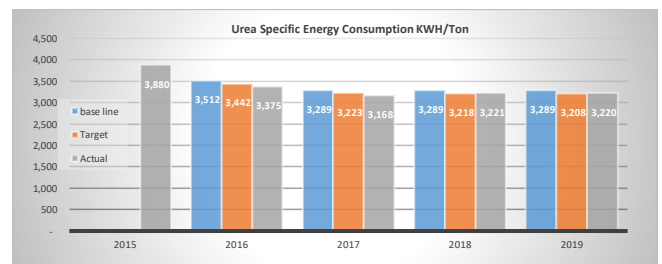
Do, Check, Act

The implementation of the operational controls, detailed operation procedures, and monitoring via an online system on MPA to track MOPCO 3 plant performance and specific consumption for ammonia and urea to reduce the deviation of energy consumption. Operators should keep the consumptions defined as significant within the established ranges. A daily energy report is also issued and includes;

- Energy specific consumption for Ammonia and urea plants.
- Boiler performance.
- Generator performance.
- Energy performance indicators based on UNODO methodology.



Also the benchmark report is issued to monitor the energy efficiency performance of ammonia plants to drive business improvement, the energy consumption decreased from 2015 to 2019 as showed below:



Daily Energy Report							Mier Fertilizere Production Company Technical Studies, Development and Energy Conservation General Management		
							Date	14/09/2018	
Ammonia According to TS&EC methodology.									
Status	N.G Energy Consumption	Steam Energy Consumption	Power Energy Consumption "Plant"	Power Energy "Grid"	Total Energy Consumption/Ammonia	EFF. Relative %			
Performance	7.325	0.285	0.293	0.014	7.919				
Actual	7.354	0.703	0.235	0.039	8.330	95.057			
Urea According to TS&EC methodology.									
Status	Refer to Ammonia Consumption	Steam Energy Consumption	Power Energy Consumption "Plant"	Power Energy "Grid"	Total Energy Consumption/Urea Production (Gcal/Ton)	EFF. Relative %			
Performance	4.482	0.789	0.205	0.010	5.486				
Actual	4.735	0.711	0.142	0.024	5.611	98.118			
Ammonia According to UHDE methodology.									
Status	Total N.G Spec. Consumption	Excess HPS Spec. Consumption	MPS to BFW Spec. Consumption	MPS to Refrig. Turb. Spec. Consumption	Demin Water preheating Spec.	Total Spec. Consumption	EFF. Relative %	Financial Loss (\$/day)	
Performance	7.484	-0.2765	0.00959	0.0162	0.1376	7.242			
Actual	8.0569	-0.7057	0.0101	0.0191	0.1486	7.9231	91.401	5920.973	
Energy Performance Indicators acc. to UNODO methodology.									
Status	Ref. Fuel Actual Cons. KWH	Ref. Fuel Expected Cons. KWH	EnPC	Boiler Fuel Actual Cons. KWH	Boiler Fuel Expected Cons. KWH	EnPC	Total Energy Actual Cons. KWH	Total Energy Expected Cons. KWH	EnPC
Target			<1			<1			<1
Actual	2529004	2492139	1.0138	5118361	5494276	0.9092	5642965	6051819	0.9315
Boiler KPIs									
Status	Boiler Efficiency (%)	Boiler Capacity(Gcal/Ton)	Ratio (Nm3 NG/Ton steam)						
Performance	88.572	0.751	84.733						
Actual	94.489	0.790	94.856						
Generator KPIs									
Status	Generator ratio (Ton/MWH)	Generator Specific Cons. (Mcal/MWH)	Generator unit Efficiency (%)						
Performance	3.560	2.860	30.09%						
Actual	3.847	3.050	28.18%						
Notes:									
* Specific Enthalpy of Water (KJ/Kg) 564.839 At 125 Bar & 130 C									
* Specific Enthalpy of Steam (KJ/Kg) 3380.45 At 115 Bar & 510 C									
* LWV is changed daily, after correction, acc. to (DIN 51867 code Uhm) instead of (ISO 8976 GASCO).									
* The expected consumption is calculated based on regression analysis for energy consumption and Urea production of year 2016.									
* BFW flow to package boiler (2835001) reading is accurate now after calibration during last shutdown.									

The energy report is sent daily to; Ammonia plant managers, Urea plant managers, Chief Production Officer. The main target is to define each equipment performance analysis, restrict the energy consumption

In cooperation with MOPCO Human Resources Management, we hold an internal training undernamed with " Energy Management System - ISO 50001 awareness Training, We send a quarterly informative e-mail to all MOPCO staff to be aligned with our energy management system activities, opportunities, progress and targets achievement in MOPCO ammonia and urea plants. In Nov., 2019 we conducted an awareness session and gap analysis for ISO 50001:2018 and it was so efficient showing a great commitment and cooperative spirit from operations, electrical, training

and maintenance teams to implement the whole energy system stuck with ISO 50001:2008 policies and recommendations.

We use a PESTLE Analysis and SWOT Analysis; to define the external issues affecting our energy performance and define opportunities and risks

- Establishing an energy management culture at all levels in the organization requires great contribution and support on the part of the management. A
- Progressing towards having an energy management system in the two sites of the company.

Transparency

MOPCO was certified by the third party ISO50001 in Dec.2019 .MOPCO is the first fertilizer company independent company to pass ISO50001:2018 certification.

MOPCO’s Business Strategy addresses directly one of the modernization project pillars and aligned with Egypt’s Vision 2030 - Downstream Performance, where in May 2019, MOPCO has awarded an appreciated Certificate from the ministry of petroleum and mineral resources during the 2nd energy efficiency conference as a result of decreasing energy consumption by implementing no and low-cost opportunities during 2018.



Lessons Learned

Through the Energy Management Working Group (EMWG), government officials worldwide share best practices and leverage their collective knowledge and experience to create high-impact national programs that accelerate the use of energy management systems in industry and commercial buildings. The EMWG was launched in 2010 by the Clean Energy Ministerial (CEM) and International Partnership for Energy Efficiency Cooperation (IPEEC).

For more information, please visit www.cleanenergyministerial.org/energymanagement.

