ISO 50001 Energy Management System – Case Study

2022 Germany

SABIC Polyolefine GmbH
Site Gelsenkirchen
Germany

With the certification according to ISO 50001 the topics of Energy & Sustainability were transferred to our day-to-day business.

Case Study Snapshot	
Industry	Chemistry
Product/Service	Polyolefines
Location	Gelsenkirchen / Germany
Energy performance improvement percentage (over the improvement period)	Energy performance improvement is close to 1% from the annual total electricity consumption
Total energy cost savings (over the improvement period) **Remark: Taxes that we did not have to pay because of the certified energy management system**	USD 150.000.000-200.000.000
Cost to implement Energy Management System (EnMS)	1.225.000 USD
Total energy savings (over the improvement period)	4827,6 GJ (1.341 MWh)
Total CO_2-e emission reduction (over the improvement period)	51.300 Metric Tons

Organization Profile / Business Case

SABIC Polyolefine GmbH / Germany operates four plants for the production of polyolefins, such as polyethylene and polypropylene, as well as their copolymers and polymer blends with a production capacity of 1,000,000 t/a on its premises. A total of 400 employees work at the site.

Energy Management Goals:

- Continuous reduction of energy consumption
- Continuous improvement of sustainability

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Motivation for implementation DIN IS0 50001:

- energy resources on earth are limited
- being sustainable with our environment
- use energy efficiently and economically
- tax incentives

⇨ saving of EEG costs (part of German electricity costs since 2000 to finance transformation to renewable energy supply - max. 6,88 Ct/KWh in 2017)

⇨ approx. 15 – 20 MioUSD/year

Chronology:

In order to structurally address the topic of energy management, the idea was born to create a management system analogous to the Quality Assurance System

- implementation according to DIN 16001 energy management system in 2010
- ISO 50001 replaced 16001, KickOff incl. communication plan
- pre audit with external support (Simon) according to RC14001 and OSHA 18001 in 2011
- certified according to 50001 and 14001 since 2012 (combined certificate);
  => remark: comprehensive approach included also ISO 14001
- Development and implementation of an energy monitoring system to define strategic and operational objectives.
  CapEx USD 1.225.000 (Energy monitoring system – USD 1.200.000, External support - consultant costs - USD 25.000, ca.200 additional measuring devices for electricity were installed on site)
- Appointment of "energy management representative" as well as "energy manager electrical" and "energy manager other energies".
- In addition appointment of "environmental management representative" and so called “environmental focal points" (1 - 2 employees from each department [Lab, Operations, Logistics, CF,..]. Linking Pin between all different departments and EHSS department to bring the topic of "Sustainability" more into the company (awareness).
- Site-Committees were established for Energy and Sustainability in 2013 and later on merged together
- Merging of “Realization of Environmental Management system" and „Responsible Care Management system“ and „Realization Energy Management system“ in „Realization Sustainability“ end of 2015
- Development and implementation of "energy aspects table" (since 2007) and "projects and program-list" (collection of all ideas, studies, projects etc. to improve sustainability of the site) in 2010, continued until today.
- Sustainability: part of management review (monthly and yearly monitoring and reporting), target planning, budget planning, ...
- External Sustainability Assessment on site Gelsenkirchen in 2016
- Founding member of the Energy Efficiency Network Rhein Ruhr (ChePap), an association of members from the chemical and the paper industry of North Rhine-Westphalia (Germany)
- ISO 50001: Annual external monitoring audits and three yearly recertification audits, additional internal audit program with the same topic content.
- Policies: In total one common corporate policy (contains all voluntary commitments, such as Responsible Care, RC 14001, ISO 14001, GMP, ISO 50001, OMS standards)

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"The mindset and involvement of our employees has changed remarkably for the better with regard to sustainability"

Olaf Quade, Manager EHSS&Q Assurance

Business Benefits

Projects to improve in sustainability (energy consumption and reduction of material loss):

Case 1: Propylen Recovery Unit PPF5

Before: complete waste gas stream of PPF5 was burned in an incinerator

After: separation of hydrocarbons from the waste gas stream with a membrane technology unit before incineration,

Investment: approx. 4,5 Mio€

Realization: 2014

Added value:

- ⇨ A) Reduction of material loss: Separation and reuse of 2.000 t of propylen/year
- ⇨ B) GHG reduction: 6.275 tCO2/year
- ⇨ C) Financial benefits: 13.800.000 € (over improvement period)

Total material loss savings over improvement period: 16.000 t (8 years)

Total GHG savings over improvement period: 50.200 t CO2

Case 2: New motor and frequency converter melt pumps extrusion lines PPF5 / LD5

Before: Energy consumption: 6.320.000 KWh/a (basis: measurement 2016 + 2017)

After: Energy consumption: 6.074.000 KWh/a

Investment: 715.000 €

Realization: 2017 + 2018

Added value:

- ⇨ A) Energy savings: 246.000 KWh/a
- ⇨ B) GHG savings: 225 t CO2/a
- ⇨ C) Financial benefits: 26.500 €/a (2021)

Total energy savings over improvement period: 1.120.000 KWh

Total GHG savings over improvement period: 1.000 t CO2

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Case 3: New motor and frequency converter pellet water pump extrusion line PPF5

Before: Pellet water pump runs at full load 24/7

Flow control via partly open/closed valve (energy destruction)

After: Pellet water pump runs with the necessary load/speed to deliver requested water amount

Former control valve completly open

Investment: 140.000 €

Realization: 2021

Added value:

- ⇨ A) Energy savings: 221.000 KWh/a
- ⇨ B) GHG savings: 100 t CO2/a
- ⇨ C) Financial benefits: 20.500 €/a (2021)

Total energy savings over improvement period: 221.000 KWh

Total GHG savings over improvement period: 100 t CO2

"This certificate confirms our responsible and sustainable use of energy. And it also grants us a considerably lower charge under the EEG (Renewable Energies Law), which significantly reduces our electricity costs.
This certificate is therefore twice as important for our site!"
—Jacques Slabbers, former Site Director Gelsenkirchen

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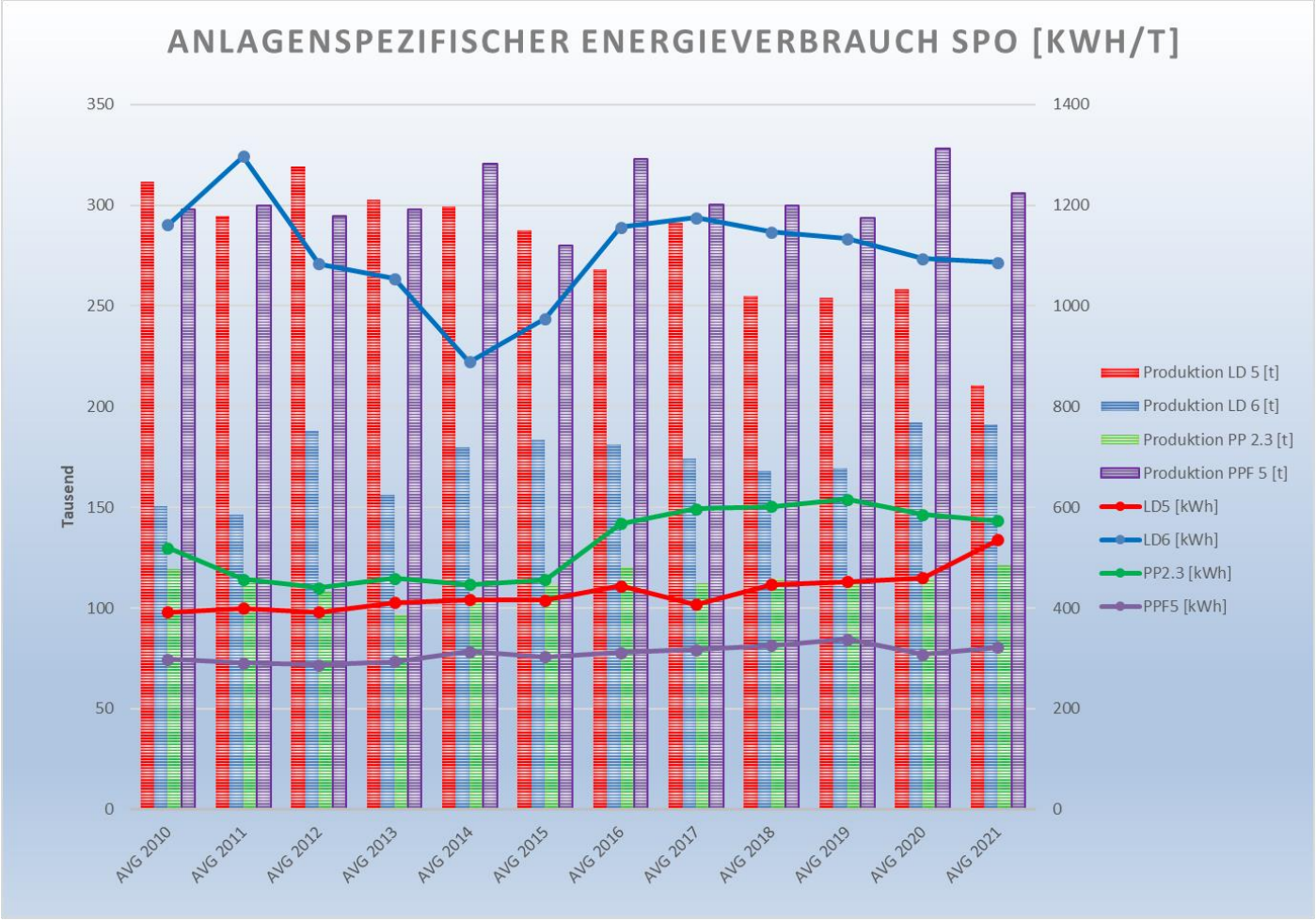
Plan

The plan is to realize at least one energy saving project per year

Do, Check, and Act

- In the meantime “plan, do check act” is part of the daily business
- Yearly check of all energy aspects and verify results with realized projects.



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Transparency

Implement Share Point / IMS file browser

- ⇨ Authorization concept for employees allows access to all informations regarding sustainability ideas/projects and energy consumptions etc.
- ⇨ In addition special informations are given via e-Mail
- ⇨ Access to “projects and programs list” and “energy aspects list” is self-evident

What We Can Do Differently

- ⇨ More sponsoring from corporate, especially CapEx is necessary to realize projects,
- ⇨ Today: Subsidies which were given from the German government are used to reduce electricity costs
  Future: A major part of such subsidies should be reinvested to fund sustainability projects
  Remark: The electricity price compensation (German subsidy due to CO2 costs) intended to maintain the international competitiveness of these companies compared with competitors who do not have to bear such CO2 costs. The aim is to prevent production re-locations and thus an increase in CO2 emissions in countries outside the EU emissions trading system (so-called carbon leakage (CL)) due to indirect CO2 costs in the EU.
- ⇨ Additional resources (people and money) to act accordingly the sustainability approach

DIN ISO 50001 Certification – Site Gelsenkirchen

ISO
50001-EN-Certificatio