SUCESS STORY SOTRAMEG

SUCCESS STORY FEATURED WITHIN THE FRAMEWORK OF THE « NET ZERO ROADMAP INITIATIVE FOR THE AGRI-FOOD SECTOR IN MOROCCO »

SOTRAMEG

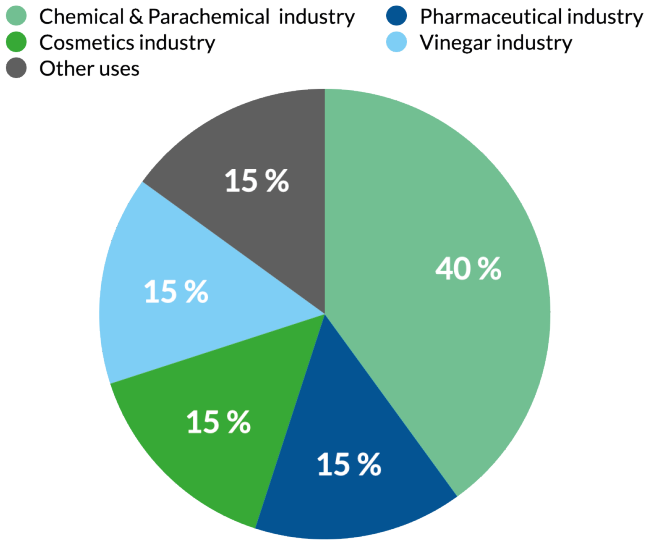
This success story is featured within the framework of the Net Zero roadmap initiative for the agri-food sector, endorsed by AMEE and UNEP. Following a thorough assessment of various projects, Sotrameg emerged as the selected company, standing out as an exemplar in the endeavor to decarbonize its activities. The company has demonstrated commendable commitment to reducing its carbon footprint through the implementation of energy-efficient practices and the integration of circular economy measures.

Projects implementation dates
2015/ 2016

Kénitra, Maroc

COMPANY PRESENTATION & VISION

Established in 1975, Sotrameg specializes in providing the domestic market with ethyl alcohol and liquid carbon dioxide, with surplus ethyl alcohol production earmarked for export. 60% of Sotrameg production is marketed in Morocco and nearly 40% is intended for the Tunisian and Spanish markets as well as certain countries in the West African region. The ethyl alcohol manufactured by Sotrameg serves diverse industries, as illustrated in the accompanying figure below.



Industries for which Sotrameg products are intended

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Ethyl alcohol is produced by fermenting beet and sugar cane molasses. Fermentation simultaneously gives rise to the production of ethanol and the recovery of carbon dioxide (CO_2) from fermentation. When the production of ethyl alcohol stops, the butane boilers of the gas companies (Liquid Air) start up to continue to produce carbon dioxide. Regarding raw materials, Sotrameg primarily procures its supplies from domestic sugar mills.

Aware of the environmental imperative, Sotrameg demonstrates an unwavering commitment to the decarbonization of its industry, guided by the enlightened leadership of its executives. he company pursues an ambitious strategy specifically designed to mitigate its carbon footprint through the adoption of sustainable practices. Sotrameg serves as a source of inspiration not only for the food and beverage sector but also for various industries, urging them to emulate its example and collaboratively participate in the decarbonization efforts shaping our national economy.

Energy efficiency has become the watchword of its policy, exemplified by substantial investments in cutting-edge technologies aimed at diminishing energy consumption. The strategic objective is to eliminate up to 82% of its CO_2 emissions by the year 2023.

Simultaneously, Sotrameg has taken tangible initiatives to advance the principles of the circular economy. These initiatives involve advocating for recycling, promoting reuse, and optimizing resource utilization, thereby diminishing both their carbon footprint and overall environmental impact.

CO_2 CAPTURE

Carbon dioxide (CO_2), emanating from the fermentation process and implicated in global warming, represents a resource that can find applications across various industries. As part of its commitment to enhance environmental sustainability and broaden its product portfolio, Sotrameg, with technical guidance from the supplier Generizon and financial backing from the EBRD's MorSEFF program, has opted to capture the CO_2 generated by its processes. Instead of allowing emissions to dissipate into the atmosphere, Sotrameg has established a CO_2 extraction and purification facility, comprising two comprehensive units, to reintegrate captured CO_2 into its production processes:

• A unit for extracting carbon dioxide (CO_2) contained in the biogas produced by the liquid effluent treatment station with a treatment capacity of 500 m3 of biogas/hour. This unit produces 300 m3/h of methane and 200 m3/h of carbon dioxide at 15 mbar.

• A unit for the production and purification of carbon dioxide (CO_2) from fermentation and biogas with a capacity of 1000 kg/hour. The purity of CO_2 is greater than 99.9% according to the ISBT standard. The pressure of liquid CO_2 at the outlet of the installation is in the range 16-18 bars. The equipment supplier guarantees a specific electricity consumption of 230 kWh/ton liquid CO_2.

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- The CO_2 extraction and purification unit including the speed variator compressor required an investment of around 10 MMAD with a simple payback time of less than 4 years.

- Average annual energy consumption fell by 20,988 MWh, corresponding to a saving of 93.8%. The average annual emissions avoided are 3,886.1 tons of CO_2, a reduction of 81.6%.

BIO-ETHANOL PRODUCTION

The implementation of a phlegm dehydration unit (hydrated ethanol at 93% vol.) from the fermentation of beet and sugar cane molasses, waste from the sugar industry, to produce pure ethanol (99, 8%). In order to minimize energy consumption during the phlegm dehydration stage, Sotrameg opted for the molecular sieve adsorption process, despite its higher cost compared to the conventional azeotropic distillation method. Generizon conducted a comprehensive study of this project, which was funded through the EBRD's MorSEFF program.

This process is advantageous because it does not use toxic chemicals (such cyclohexane employed as a third-party agent), and circumvents the susceptibility associated with the membranes currently prevalent in the market.

The produced ethanol will be seamlessly integrated into premium gasoline at a 5% concentration, requiring no modifications to engines or the existing infrastructure for gasoline storage, transport, and distribution in Morocco. This integration enhances the combustion efficiency of gasoline by elevating the octane number of the blend. The direct incorporation facilitates widespread access to the environmental benefits of bioethanol, resulting in a substantial reduction of approximately 60% in greenhouse gas emissions.

- The phlegm dehydration unit via an efficient and energy-saving process required an investment of approximately 8 MMAD and a simple payback time of 5 years.

- The implementation of the gasoline-ethanol blend project made it possible to reduce well-to-wheel CO_2 emissions from gasoline vehicles by nearly 60% compared to the baseline (gasoline alone).

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H_2S RECOVERY

Sotrameg has also implemented a biological treatment unit for H_2S to prevent its release into the atmosphere (a harmful gas) and limit corrosion issues. Additionally, the reclaimed H_2S is reused and injected into their production process as sulfuric acid.

- The H_2S biological treatment unit required an investment of between 4 and 5 MMAD.

Energy efficiency

- Efficient and energy-saving production lines
- Optimization of production lines

CO_2 emissions reduction

- BIOGAS production
- CO_2 Capture

Circular economy

- CO_2 reuse
- H_2S reuse after biological treatment
- Waste water treatment

Reduction in annual energy consumption — 94%

Reduction of CO_2 emissions — 82%

Reduction of well-to-wheel CO_2 emissions from gasoline vehicles — 60%

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GOOD PRACTICES AND RECOMMENDATIONS

1

Establish a decarbonization strategy integral to the company's strategic vision, outlining specific and attainable objectives.

2

Allocate an internal team responsible for executing and overseeing environmental and climate projects.

3

Conduct a carbon footprint and/or energy audit to identify targeted energy efficiency measures.

4

Integrate the principles of the circular economy across the entire value chain.