

Global Green Chemistry Initiative Case Study

CHANGE IN THE FORMULATION OF SOLVENTS DERIVED FROM PETROLEUM
FOR D – LIMONENE CONSIDERED GREEN SOLVENT IN
SEVERAL POLIKEM PRODUCTS



Yale

BACKGROUND

POLIKEM is a Company dedicated to the design, manufacture, storage and commercialization of products for the automotive, metalworking, household and I&I cleaning. The company is specialized in Aluminum Anodizing, metal finishing as well as outsourcing and maquila services.



POLIKEM's trajectory and performance has made it worthy of national as well as international awards. In 2014, the UNITED NATIONS, through its division UNIDO (United Nations Industrial Development Organization), granted POLIKEM the "Gold" award among 50 companies that participated in the Global Chemical Leasing 2014, which recognized the performance of the POLIKEM in regards to innovation, economic and environmental impact, and the application of Chemical Leasing in the industrial sector.



STAKEHOLDERS



WORKERS

Reduction of toxicity risks for chemical substances handling.



CUSTOMERS

(as Renault, Mazda, Kia, Yamaha, Honda)

Reduction of VOC's during applications.



COMPANY

Alignment with environmental policy.



COMMUNITY

VOC emissions during manufacturing and applications.

CENTRAL PROBLEM

Volatile organic compounds



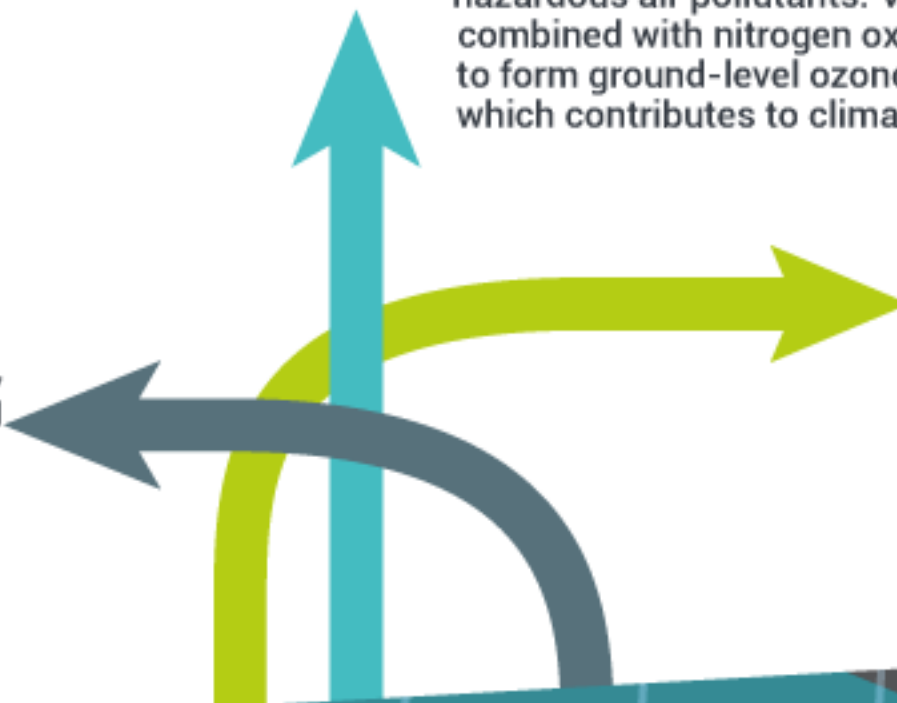
Many products used for household, institutional and industrial cleaning contain certain volatile organic compounds, in most cases from nonrenewables sources.



Many volatile organic compounds are hazardous air pollutants. VOCs, when combined with nitrogen oxides, react to form ground-level ozone, or smog, which contributes to climate change.



The health effects of volatile organic compounds can vary greatly according to the compound, which can range from being highly toxic to having no known health effects.



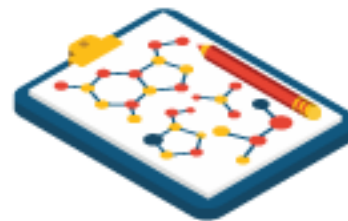
SOLUTIONS/ACTIONS

OBJECTIVE

Improve the environmental impact at the supply chain, using green components from renewable sources.

↔ Replacement the substances

Perchloroethylene, MEK, Acetone, Hexane, Toluene, Benzene and derivatives.



ACTIONS

- Search for better alternatives for the replacement.
- APQP and PPAP methodologies for ensuring the reliability of development.
- Analysis and multiple laboratory tests and subsequent performance tests.

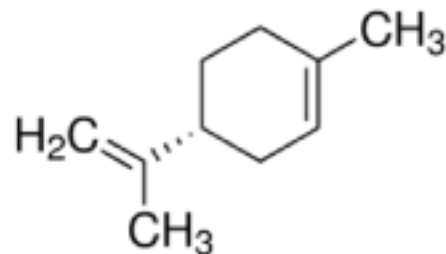
SOLUTIONS/ACTIONS



Petroleum-derived solvents



D-Limonene



D-limonene is one of the most common terpenes in nature. It's a major constituent in several citrus oils. It's obtained for extraction from citrus peel. D-limonene is listed in the Code of Federal Regulations as generally recognized as safe (GRAS), because of fairly low toxicity. It's considered a green solvent.

SOLUTIONS/ACTIONS

We make the changes in the following products:

- Chain and motor degreaser. Used for motorcycles and bicycles (for customers as Yamaha, Honda).
- Brake system cleaner. used for vehicles (for customers as Renault, Mazda, Kia, Yamaha).
- Grease remover. used for household and I&I cleaning.
- Electronic cleaner. used vehicles, household and I&I cleaning.



Removal of
Perchloroethylene of Brake
Cleaner and Electronic
Cleaner formulations.

LESSON LEARNED



We have **contributed to have better processes environmentally** and we have **defined a policy of constant analysis of all formulations** of our products to reduce the impacts throughout the value chain, from our plant to our customers.

We have continued the **search for replacement of surfactants and solvents petroleum-derived** by substitutes from renewable and sustainable sources.

This practice has helped us to **check frequently green substances** and **more friendly substance database** in order to rethink in more friendly products for our customers and environment.

Also, alternatives for replacement of phosphates in detergents and cleaners are our concern.