

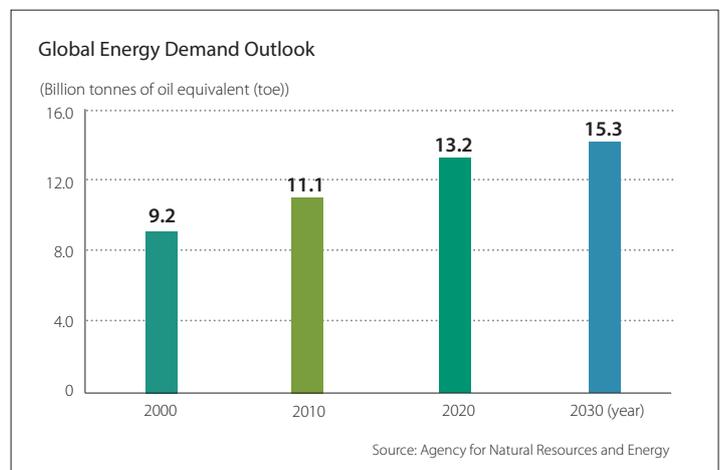


Special  
Feature  
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## Easing the Environmental Burden

Global energy demand is forecasted to increase even further with expected population growth and improvements in living standards particularly in emerging countries. Accompanying these trends are mounting global environmental issues mainly concerning greenhouse gas emissions, depletion of natural resources, and air and water pollution.

Sumitomo Chemical is working to ease the environmental burden by harnessing the power of chemistry to effectively use limited natural resources to the maximum extent possible. Along with focusing on three areas—energy generation, energy storage, and energy saving—Sumitomo Chemical is developing Green Processes, which are manufacturing processes that limit environmental impact to the maximum extent possible throughout product life cycles, and Clean Products, which are more environmentally friendly.



## Initiatives to Comply with Gas Emission Regulations

Reflecting the heightening awareness of environmental problems, countries throughout the world have tightened regulations on gas emissions in recent years. Against this backdrop, Europe, where fuel-efficient, low-CO<sub>2</sub> emission diesel vehicles are prevalent, has implemented the world's most stringent emission regulations, making diesel particulate filters (DPFs) mandatory as standard equipment in diesel vehicles. These regulations are expected to be applied to additional vehicle models.

Sumitomo Chemical has developed its DPF, SUMIPURE™, using technologies cultivated in the business of inorganic materials, such as alumina products. The DPF features excellent heat resistance and a special structure that continuously captures a high volume of particulate.

Our simplified DPF manufacturing process has contributed to reductions in costs and waste emission volumes.

A European automobile manufacturer has decided to use our DPFs and our wholly owned subsidiary Sumika Ceramics Poland Sp. z o.o. will start manufacturing and supplying the DPFs from 2015.



Diesel particulate filters (DPFs)

## Shifting from Metal Components to Super Engineering Plastics

Expectations have been rising in recent years over the use of super engineering plastics as an alternative to metal components in the automotive and various other fields. Sumitomo Chemical's super engineering plastics are lightweight, heat resistant, and highly moldable while maintaining sufficient strength. As a result, our super engineering plastics have a wide range of uses in various everyday items, such as electronic, electric, automotive, and aircraft components.

Among Sumitomo Chemical's super engineering plastics, polyether sulphone (PES), which boasts a long track record, was the first in the world to be authorized for use as aircraft components. Carbon-fiber reinforced plastics, which contain our special epoxy resin mixed with SUMIKAEXCEL PES, display

maximum levels of durability and shock absorption. The carbon-fiber reinforced plastics help to lower aircraft weight and thus improve fuel efficiency, garnering high marks from the aviation industry.



Super engineering plastics

## Supporting the Spread of Environment-Friendly Electric Vehicles

Lithium-ion secondary batteries are used in a wide array of items including electric vehicles and smartphones. With improvements in product performance boosting power consumption, developing lithium-ion secondary batteries with higher capacity while maintaining safety has become a key theme. Sumitomo Chemical's heat-resistant separator for lithium-ion secondary battery PERVIO™ was developed leveraging the Company's proprietary technologies cultivated over many years involving polymerization, inorganic materials, and polymer molding, contributing to improvements in battery safety. PERVIO™ is used in lithium-ion secondary batteries produced by a major domestic manufacturer, which are then installed in luxury electric vehicles in the United States. Amid rising expectations over society's use of clean energy and growing demand for electric vehicles, we have boosted PERVIO™ production capacity by 2.3 times between 2014 and 2015.



PERVIO™



### [Green Processes]

Producing chemical products requires the use of limited natural resources and energy. Sumitomo Chemical is working to ease the environmental burden to the maximum extent possible by developing Green Processes, which are manufacturing processes that curb or effectively use the emission of unwanted substances such as by-products and waste materials during production.

#### Hydrochloric Acid Oxidation Process

A process called hydrochloric acid oxidation converts by-produced hydrogen chloride into chlorine using catalysts and oxygen. This process achieves an extremely high chlorine conversion rate of 99% using far less electricity. In 2014, this process was newly registered as a method of calculating CO<sub>2</sub> emission reduction under the United Nations Framework Convention on Climate Change.



Hydrochloric acid oxidation process equipment

#### CO<sub>2</sub> Separation Membrane

Sumitomo Chemical has developed a process that uses CO<sub>2</sub> separation membranes to extract unneeded CO<sub>2</sub> from target gases in the production of hydrogen and refining of natural gas. It is a simple method of removing CO<sub>2</sub> by letting gas flow through the process, helping reduce energy used in separation and scaling down the size of facilities. Sumitomo Chemical has been accelerating efforts to start full-fledged CO<sub>2</sub> separation business.



CO<sub>2</sub> separation membrane

#### Vapor-Phase Caprolactam Process

Sumitomo Chemical produces caprolactam, which is used to make nylon, through its proprietary vapor-phase caprolactam process without generating ammonium sulfate as a by-product. This process reduces the amount of feedstock required in production by 25 to 40% and extends the service life of plants due to the removal of ammonium sulfate.



Vapor-phase caprolactam process equipment

#### PO-Only Process

Sumitomo Chemical manufactures propylene oxide (PO), which is used mainly as a raw material for polyurethanes, through its proprietary PO-only process. This process does not generate unneeded by-products owing to the reuse of cumene, a major chemical compound. This process also contributes to the effective use of heat generated in chemical reactions, and the reduction of wastewater emission.



PO-only process equipment