Overview of Environmental Contribution Products

Product Name	Overview
Ion-exchange membrane process for chlor-alkali electrolysis	Caustic soda and chlorine are manufactured through the electrolysis of brine. The methods of electrolysis are the mercury process, the diaphragm process, and the ion- exchange membrane process. The ion-exchange process is a method that does not use the harmful materials mercury or asbestos. We are unique in that we manufacture and sell ion-exchange membranes, electrolyzers, and electrodes, and our products are widely used around the world. We have engaged in continual development to enable electrolysis by ourselves using even less electricity, and our latest ion-exchange membrane grade has significantly lowered power consumption (compared with Asahi Kasei products: approximately 2% less than our current grade).
With the second seco	Acrylonitrile, which is the raw material for carbon fiber, ABS resin, and acrylic fiber, is manufactured by making propylene react with ammonia. We have continually developed catalysts that assist reactions in order to enable efficient manufacture of acrylonitrile from less raw materials. As compared to production processes using other, ordinary catalysts (in the model case), production processes using our catalysts have a low environmental impact due to the fact that these processes can (1) reduce raw material consumption, (2) reduce emissions of by-products, particularly CO ₂ , and (3) lower CO ₂ emissions associated with waste processing.
Dimethyl carbonate production process using CO2 as a raw material	This is a process using CO ₂ as one of its raw materials to produce dimethyl carbonate. We license a technology for this manufacturing process. This process utilizes CO ₂ released into the atmosphere by other plants as a raw material, thereby contributing to reducing CO ₂ . Demand is rising sharply for the product, dimethyl carbonate, as a raw material for polycarbonate and the electrolytes in lithium-ion batteries (LIB) for electric vehicles (EVs) and other products. Ethylene glycol—used as a raw material for polyester fibers, PET resins, and antifreeze—is a secondary product of this process.
Polycarbonate production process using CO ₂ as a raw material	This process using CO ₂ as one of raw materials to produce polycarbonate, for which we license the technology. This process utilizes CO ₂ released into the atmosphere by other plants as a raw material, thereby contributing to reducing CO ₂ .Also,since the process does not use solvent, it is notable compared with other process that no environmental burden occurs for disposal of spent solvent. Polycarbonate is used in various applications, such as automobile headlight covers, carport roofs, helmets, water bottles, and substrate layers for CDs, DVDs, and BDs, as well alloy with ABS and PBT is used for exterior materials materials for electronic devices. Ethylene glycol is a secondary product, used in polyester fibers, PET resins, and antifreeze

Product Name	Overview
Cyclohexanol production process	This process produces cyclohexanol, an intermediate material for nylon and other chemical products, through the cyclohexane process, which Asahi Kasei were the first in the world to develop. The cyclohexene process is notable in that it generates virtually no waste and has a carbon yield of nearly 100%. Compared to conventional methods, this method uses small amount of raw materials and generates less CO ₂ in waste treatments, which reduces the impact on the environment.
	This process produces adipic acid, a raw material for plasticizers for polyurethane and resins. Our adipic acid production process, which uses cyclohexanol produced by our cyclohexane process as a raw material, efficiently breaks down the nitrous oxide (N ₂ O) produced by the production process and reduces GHG emissions, thereby contributing to reducing environmental impacts.
Adipic acid production process	
Lithium-ion battery (LIB) SeparatorsImage: Separator of the s	The separator is one of the four main components (cathode, anode, electrolyte, and separator) that make up the batteries (LIBs) for electric vehicles (EV/HEV/PHEV). As a result of their growing popularity, electric vehicles are contributing to a reduction in CO ₂ during driving, compared with gasoline vehicles. Improving the battery performance (extending driving range and ensuring safety) is essential to more popularization of electric vehicles, and Asahi Kasei's development of separator technology is playing a part in this.
Elastomer for asphalt modification	This product is used as an additive for the modified asphalt used in road surfaces. This elastomer specially designed by Asahi Kasei can improve road durability and decrease the frequency of maintenance and repairs.

Product Name	Overview
For fuel-efficient tires	S-SBR is used for the tread (the part in contact with the road) on passenger vehicle tires. Based on development of original technology, it balances low fuel consumption and braking performance of tires at a high level, contributing to the fuel efficiency of automobiles.
	Dinamica [™] is an artificial suede with a 3-layer structure produced with Asahi Kasei's proprietary manufacturing process. Having excellent texture and versatile design, it is actively being marketed both in Japan and overseas in various applications such as automotive interiors, furniture, IT accessories, clothing, and industrial materials. Dinamica [™] contributes to reducing CO ² emissions in two ways: 1) by increasing the usage rate of recycled polyester material, and 2) by using water-based polyurethane.
Dinamica ¹ artificial suede	
	This engineering plastic is an environmentally conscious material due to its non-halogen flame retardance and reduced resin usage resulting from its low specific gravity. It also has features such as dimensional precision, mechanical strength, and resistance to electrolyte solutions. It is extensively used in the cells and structural components of automotive secondary batteries, supporting the expansion of electric vehicles.
Modified PPE "Xyron [™] "	
(automotive secondary battery component)	
THE	ASACLEAN [™] is a cleaning agent (purging compound) for use in plastic molding machines. At plastic molding sites, when switching between production of different colors and resin types, it is necessary to keep the materials flowing to a certain extent, which inevitably results in loss. By using ASACLEAN [™] during the production switching process, it is possible to make the switch using about 1/3 to 1/10 the amount compared to not using ASACLEAN [™] , which contributes to conserving resources and reducing CO ² by decreasing plastic waste.
ASACLEAN™ Purging compound	

Product Name	Overview
	DURANOL [™] is used as a raw material for high-performance polyurethane resin in applications that require durability. A water-dispersible grade developed using our proprietary technology is the world's only polycarbonatediol that can be diluted and dispersed in water without using organic solvents. Using this product allows for more use of water- based paints, etc., which contribute to reducing CO ₂ emissions because of less use of organic solvents.
DYRANOL [™] polycarbonatediol for soft feel paint	
HDI-based polyisocyanate "Duranate™" low viscosity grade	By using "Duranate [™] ", polyurethane paints with excellent weather resistance and other properties can be obtained. A low-viscosity grade developed with our proprietary technology leverages its low-viscosity characteristics to reduce the need for organic solvents in paint production, contributing to CO ₂ reduction. It also allows for easy dispersion in water-based resins, supporting the transition to water-based, high-solid, and solvent-free paints and coatings.
Modified PPE "Xyron™" (solar cell connector material)	This material is one of engineering plastic and environmentally conscious due to its non-halogen flame retardance and reduction of resin use resulting from its low specific gravity. Its excellent insulation properties make it suitable for use in high-voltage photovoltaic systems, where fewer modules are needed, thus conserving resources. Additionally, its low specific gravity contributes to the reduction of CO ₂ emissions during transportation.
Filtration membrane "Microza™"	"Microza [™] ," utilizing hollow-fiber membrane filtration technology, addresses challenges in a wide range of fields, from water treatment to the purification and concentration of liquid products. With its high durability, "Microza [™] " contributes to improving water environment and eliminates the need for frequent replacements, thereby helping reduce CO ₂ emissions throughout the product lifecycle, including manufacturing, distribution, and disposal.

Product Name	Overview
AWP™ photosensitive resin for printing platos	This is a printing plate material that does not use VOC (volatile organic compound; a cause of worsening air quality) solvents during the development process. Moreover, simplifying the drying process contributes to reduced CO ₂ emissions by energy consumption reduction. Printing losses can also be reduced due to excellent printing quality and high productivity during printing, thereby contributing to a reduction in CO ₂ emissions.
Tor printing plates	As high-power UVC LEDs, emit 265 nm deep ultraviolet (UVC), the most effective wavelength for sterilization, they are utilized for water servers. Recently, UVC LEDs have been used for air sterilization. Since UVC LEDs can be instantly turned on and off, it is possible to design equipment that uses power only when sterilization is required, which helps to save energy. In addition, unlike the conventional mercury lamps (UV lamps) used for UV sterilization, UVC LEDs do not use mercury, which is hazardous to the environment.
UVC LEDs for water sterilization	
For a series For a series For a series	Gas sensors are compact, highly accurate and energy- saving. They can detect the concentration of CO_2 in the air. By mounting this product in industrial air-conditioning systems and optimizing the amount of ventilation while monitoring the CO_2 density will contribute to reductions in power consumption for air conditioning.
Current sensors (components for large air conditioners)	Because our current sensors generate less heat and can accurately measure large currents, they are used in compressor motors of exterior units for large air conditioners in commercial facilities and office buildings. Used as an important component for inverter control, the current sensors can reduce start-stop loss and operate at arbitrary speed. It helps to save energy (lower power consumption) in large air conditioners. In addition, our current sensors have high-accuracy and fast-response features. They greatly contribute not only to the smaller number of installed parts, but also to higher efficiency and improved controllability. And since they generate less heat, it means that exterior air-con units can be made smaller.

Product Name	Overview
Hall elements and Hall ICs (components for home air conditioners)	Fan motors in home air conditioners are increasingly replaced from non-inverter control to inverter control, which allows more precise operation control and helps to save energy. Hall elements and Hall ICs are used in fan motors of indoor units and are essential components for realizing inverter control. Our Hall elements and Hall ICs feature high sensitivity and stable temperature characteristics. We have built a stable supply system producing approximately 1 billion units per year which are widely used around the world. With further spread of inverter control, our Hall elements and Hall ICs can greatly contribute to energy savings and CO ₂ reductions.
A photo shows a wafer formed ICs for TCXO.	Crystal oscillators used in communication base stations are required high frequency precision. Conventionally, OCXOs(Oven Controlled Crystal Oscillators), which maintain a certain temperature by heating with a built-in heater, have been used to suppression the decline in frequency precision due to ambient temperature change. However, the heating by the built-in heater results in high power consumption. In response to this issue, we have developed an IC that compensates frequency with ultra- high precision, without heaters. Crystal oscillators equipped with this IC are called TCXOs (Temperature Compensated Crystal Oscillators) and they achieve frequency precision equivalent to OCXOs with lower power consumption. Replacement from OCXOs to TCXOs contributes to the reduction of CO_2 emissions.
Fcoloop [™] OPS film	Ecoloop [™] OPS film is used in the window film of envelopes, and has more than 50% market share for windowed envelopes. Ecoloop [™] uses more than 50% recycled material (recycled waste biaxially oriented polystyrene sheets) and has received Eco Mark (Japanese ecolabel) certification. This contributes to reducing CO ₂ emissions during manufacturing, due to reduction in use amount of virgin resin

Product Name		Overview
Image: Additional state of the state o	Image: Constraint of the second se	Long Life Homes and Net Zero Energy Houses:our products meet the standards for Net Zero Energy House, which require zero or lower energy balance in the home, through power generation, advanced insulation and energy conservation. And, we provide long-life homes with more-their 60 years durable life of basis frame structures. These features contribute to reduction of CO ² emitted from manufacture of all components and construction compared with general housing
		This is a high-level insulation material, providing high insulation and maintaining its insulating properties for long periods of time. In addition, this insulation material reduces environmental impacts in a variety of ways, such as by not using any CFC or substitutes for CFC as foaming gases, in which we had the first success in the industry.
Neoma Foam [™] insulation material		