

## Kirin Holdings Teams Up with Mitsubishi Chemical on Chemical-based recycling for PET bottles

- Promoting continuous plastics recycling in society -

**TOKYO, Monday December 28, 2020** - Kirin Holdings Co., Ltd. will embark on a joint technical analysis and feasibility study into recycling PET bottles using the process known as chemical recycling\*<sup>1</sup>, to begin in December 2020. Kirin Holdings will conduct this in tandem with Mitsubishi Chemical Corporation.

\*1: Chemical recycling - The process of sorting, crushing and cleaning used PET bottles to remove dirt and contaminants, then using depolymerizing (a form of chemical decomposition) to produce intermediate raw PET materials that is refined then re-polymerized (synthesized) to make new PET bottles.

### ● Creating a “Cycle of Recycling”

As part of an ongoing commitment to promote continuous recycling of plastics in society, Kirin Holdings and Mitsubishi Chemical will develop a chemical recycling system specifically designed for PET bottles, with the aim of setting up a continuous “cycle of recycling.” This involves collecting consumed PET bottle products, converting them to raw PET materials via chemical recycling, and then producing new PET bottle products from the recycled materials. During the course of this initiative, the two companies will be partnering with a range of businesses and organizations around the world that are similarly committed to the principles of open innovation and plastic recycling.



### ● Conventional PET Recycling Process in Japan is Not Enough

Only a small proportion of PET bottles in Japan is recycled into new PET bottles. The bulk of recycled PET material is used to make food trays, textiles for clothing, and other products. Thus, although PET bottles are recycled and reused, they are often incinerated afterwards without being recovered or recycled, and this approach does not necessarily constitute sustainable recycling. Furthermore, the occasional presence of contaminants in used PET bottles has made it difficult to secure a consistent supply of PET bottles to the cleanliness standard required for recycling. Conventional mechanical recycling\*<sup>2</sup>, meanwhile, cannot efficiently isolate recyclable plastic from other unwanted materials in a PET bottle. This means that the quality of the plastic drops slightly every time it is recycled.

\*2: Mechanical recycling - The process of sorting, crushing and cleaning used PET bottles to remove dirt and contaminants, then using a combination of heat and vacuum conditions to remove volatile constituents and modify the physical properties, resulting in a viable PET material.

### ● What the New Process Does

In the chemical recycling process conceived by Kirin Holdings and Mitsubishi Chemical, used PET bottles are first sorted, crushed, and cleaned to remove dirt and contaminants. The crushed material is then depolymerized via chemical decomposition to break it down into intermediate raw PET materials. These intermediate materials are then refined and re-polymerized (i.e., synthesized) back to PET form. The synthesized materials have a much higher level of purity and are suitable for making new PET bottles.

Mitsubishi Chemical operates PET production facilities in Japan and overseas, and boasts extensive experience and technical expertise in the field. The new Circular Economy Department, established in April 2020, is evidence of its increasing focus on circular economy initiatives, which aligns perfectly with Kirin Holdings’ commitment to exploring continuous plastic recycling solutions in society.

Chemical recycling is more effective at removing dirt and contaminants from PET bottles and other PET products, which means that PET materials currently diverted to thermal recycling or even waste can now be

safely recycled. The joint recycling initiative by Kirin Holdings and Mitsubishi Chemical will ultimately seek to produce new PET bottles from a range of used PET materials — not just PET bottles — and may even produce a range of PET products other than bottles. Due to limitations of cost and scale at the current point in time however, the technical study will focus on setting up the core systems to enable sustainable PET recycling in the collaboration between Kirin Holdings (as the PET user) and Mitsubishi Chemical (as the PET manufacturer).

● **This is Just the Start – Chemical Recycling Plant to Go Online by 2027**

The Institute for Packaging Innovation at Kirin Holdings will begin working with Mitsubishi Chemical on the joint initiative in December 2020 with the broad aim of building a fully operational chemical recycling plant by 2027. This is consistent with the wider Kirin Group target of 50% recycled plastics in domestic production operations by 2027 as espoused in the *Kirin Group Plastic Policy*, established in February 2019. The recycled plastics will be supplied to Kirin Group’s Kirin Beverage Company for PET drink bottles, and may eventually be sold in the market.

The Kirin Group is committed to promoting global CSV<sup>\*3</sup> by creating value in the fields of foods and health care. *Kirin Group Environmental Vision 2050*, a new vision statement on stronger social and corporate resilience established in February 2020 as part of the broader CSV environmental initiative, calls for sustainable recycling of containers and packaging at the macro level. Meanwhile, the *Kirin Group Plastic Policy* sets a target of 50% recycled plastics in domestic PET bottle manufacturing operations by 2027. To this end, the Kirin Group will continue to explore sustainable container and packaging solutions that make use of recycled materials and biomass.

\*3: Creating Shared Value: combined added value for consumers as well as for society at large.

The Kirin Group is committed to ensuring that future generations are able to enjoy the richness and diversity of our planet in years to come, and we want to share this vision with others at every point of the value chain. To this end, we are actively engaged in a range of programs and initiatives designed to address issues and challenges in the world.

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