# WHAT IS CHEMICAL PROCESSING FOR MATERIAL RECOVERY?

## The Difference Between Processing and Recycling

## What Exactly Counts as Recycling

**Mechanical recycling** processes involve material separation, removal of contaminants, and manufacturing using those materials recovered. **Chemical processing** involve chemical reactions transforming from initial compounds into other compounds, with other uses, often involving hazardous byproducts. While some chemical processes can enhance material recovery, most chemical processes have yet to demonstrate compliance with California's recycling standards for plastics and textiles.[1]

## What Does Recycling Mean in California?

Labeling a process as recycling without verifying both the input and output product quantities opens the door to stockpiling, waste dumping, or harmful end-uses. Moreover, while plastics can technically be burned or processed into fuels, neither of these chemical processes are considered recycling by the State of California.[2]

Under California law, recycling facilities that process material for recycling and produce no more than 10% residuals, and contain no more than 1% putrescible materials are not regulated as permitted solid waste facilities by CalRecycle.[3]

**PROCESSING VS. RECYCLING**

**CPSC believes processing technologies should only qualify as recycling processes with a verified responsible end-market. To qualify, recycling processors must include metrics that measure impacts on both human health and the environment.**

Extended producer responsibility (EPR) laws in California for packaging (SB 54) and textiles (SB 707) added additional requirements for a process to qualify for recycling. Mechanical and chemical processes only earn the recycling designation based on proof of responsible end-markets, GHG performance, limited hazardous waste generation, data reporting, and other performance requirements.[1]

## CPSC's Position

Chemical recovery processes, particularly for complex textiles that blend petrochemical and bio-based fibers, are necessary for enabling material separation and reclamation. Chemical management is critical across all material processing pathways to ensure safety, regulatory compliance, and sustainability. Material processing should only be called recycling if health protections and performance goals are met, and tracking to final disposition verifies recovery claims with data from responsible end-markets.

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## Stockpiling of Outputs:

Global plastics production far exceeds the capacities for environmentally responsible collection and processing of those materials at the end-of-life. Purveyors of plastic products have a long history of making unsubstantiated environmental claims with respect to recycling and compostability for end-markets.

As long as global plastics production exceeds global management capacity, extra caution is warranted before counting stockpiled process outputs as recycled materials. Piles of plastic pellets or nurdles are not the same as recycled plastic products, and our recycling programs should not support the creation of such piles in the name of recycling.

## Industrial Processes for Materials Recovery:

The term “Risk,” is used as the potential for environmental and human health impact.[1]

**EXPAND (LOW RISK)**

- Mechanical
- Methanolysis
- Glycolosis
- Enzymolosis

**EXPLORE (MID RISK)**

- Innovative depolymerization
- Refuse derived fuels
- Solvent-based emerging technologies

**CAUTION (HIGH RISK)**

- Pyrolysis
- Gasification
- Combustion
- Waste-to-Energy

## Responsible Recycling Requires Transparent Reporting:

Recycling programs must keep human and environmental health impacts minimized and ensure the materials processed are managed responsibly in the circular economy. This is especially important for protecting worker safety and the front line communities at risk for the health impacts.

An equitable program needs to track material flows through final disposition to ensure processed feedstocks are not burned or stockpiled. Methods of tracking and crediting recycling processes can vary by program and are important for a program’s effectiveness, especially for enforcing recycled content mandates.

Contact CPSC today to get involved in policy development and implementation.

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1: Uekert, T.,et al. (2023). Technical, Economic, and Environmental Comparison of Closed-Loop Recycling Technologies for Common Plastics. ACS Sustainable Chemistry & Engineering, 11(3), 965–978

2: Hogue, C. (2023). California mandates recycling of many single-use plastic items. Chemical & Engineering News.

3: State of California. (n.d.). Permitting transfer/processing operations and facilities. CalRecycle Home Page. https://calrecycle.ca.gov/swfacilities/permitting/facilitytype/transfer/