



## Molecular Recycling Principles

**Mechanical and molecular recycling are both necessary to create circularity and principal focus areas should include:**

1. Material to material: Molecular recycling should be a viable option in improving the circularity of plastics, and processes that only produce energy / fuel should not qualify as recycling or towards meeting recycling mandates for plastics (e.g., rates and content).
2. Complement, not compete: The integration of molecular recycling technology can be complementary to mechanical recycling processes for the increased recovery of post-consumer recycled content. Molecular recycling can supplement recycling for materials that mechanical recycling is unable to recover efficiently and/or recover as raw material safe for use in consumer packaging.
3. Equal environmental oversight: Molecular recycling should be subject to the same environmental permitting and oversight as a manufacturing facility under federal, state, and local laws. This includes health, safety, and environmental consideration given to surrounding communities.
4. Accountable and Verifiable: Quantifiable and transparent chain of custody approaches, specifically credit based mass balance, should be utilized to follow materials through the value chain and to account for recycled content based on mass balance attribution.
5. Equal consideration for legislative and regulatory requirements: Mechanical and molecular recycling should equally be accepted as tools in meeting legislative and regulatory requirements when the raw material output from the molecular recycling process utilized can, through a life cycle assessment or other scientific evidence-based form of analysis, demonstrate environmental benefits or mitigated/reduced environmental impact such as reduced greenhouse gas emissions. For example, PCR levels, recycled content targets, recycling rates, etc.
6. Equal environmental marketing consideration: For the purposes of environmental marketing, plastic products containing amounts of molecular recycling process outputs, excluding fuel and energy, should have a substantially similar meaning to PCR recovered through mechanical recycling processes. Above all, these technologies should be recognized as a legitimate form of recycling subject to applicable standards of competent and reliable scientific evidence.
7. Preferred definition(s) should consider several criteria, including:
  - a. Mechanical recycling: The process of taking plastic waste and separating, washing, cutting and melting it down to create secondary raw materials that can be used in the production of new plastic items such as packaging.
  - b. Molecular recycling: The process of converting plastic back to its basic building blocks or extracting polymers (without breaking them into monomers) from post-consumer plastic in order to create new plastic products or packaging.
    - i. Defined as a manufacturing process, rather than a waste management process.
    - ii. Counts towards meeting recycling or recycled content rates.



- iii. Provides for upcycling and true circularity.
  - iv. The outputs of these processes do not account for the generation of energy or fuel.
8. Actions support continued innovation for improved materials circularity: Regulatory action must be conducive to the advancement of new technologies capable of improving upon material circularity. Restrictive or overly prescriptive guidance and regulation may inadvertently hinder the development of molecular recycling technology.