Shaping a Federal Strategy for Chemical Recycling

Toward Sensible Applications of Emerging Technologies in US Plastic Waste Management

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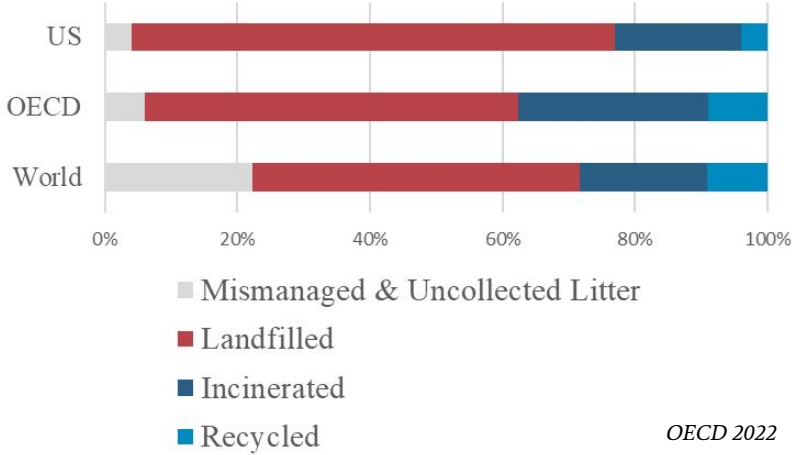
The US produces significant plastic waste **without significant recycling**.

Global Plastic Waste Management



OECD 2022

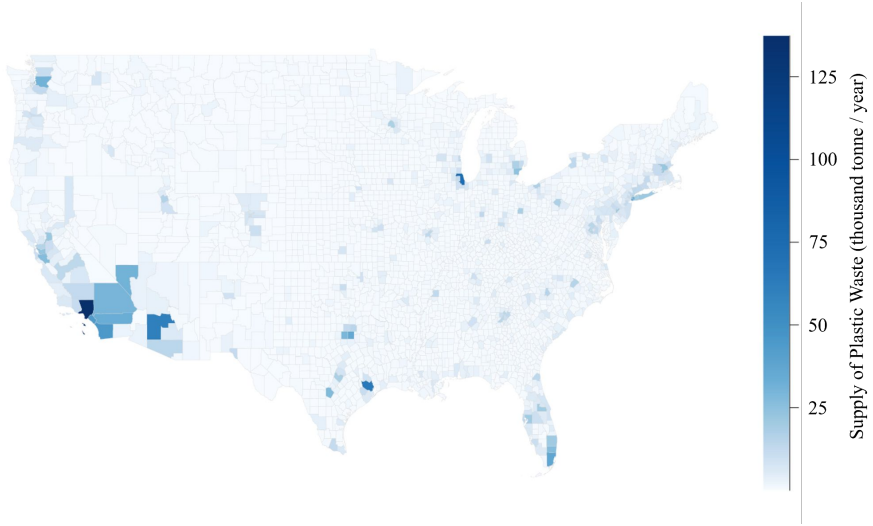
400 million

tonnes of plastic waste is produced every year

< 10%

of plastic is recycled globally

US Plastic Waste Production



221 kg

per capita plastic waste production in the US

< 6%

of plastic is recycled in the US

Mechanical recycling is severely limited, but **chemical recycling** alternatives are diverse.

Traditional Recycling

Mechanical
Waste to Plastic
Specific Plastics

Washing, shredding, melting, etc.

P2P
Plastic-To-Plastic

Established System
Limited Applications
Decreased Quality

Chemical Recycling

(1) Conversion
Waste to Chemicals
Mixed Plastics

Pyrolysis, Gasification (Commercial)

P2F
Plastic-To-Fuel / Feedstocks

(2) Depolymerization
Waste to Monomers
Specific Plastics

Hydrolysis, Methanolysis (Research)

(3) Purification
Waste to Polymers
Specific Plastics

STRAP, Solvolysis (Research)

P2P
Plastic-To-Plastic

More Versatile
Higher Quality
Limited Infrastructure

Current applications are limited & uncoordinated for US plastic waste management.

US Chemical Recycling Infrastructure Trends

- Eight facilities in 2022
- None implement plastic-to-plastic
- Sited in disproportionately low-income / communities of color

Chemical Recycling in the US (2022)

Plastic-to-Fuel (pyrolysis)

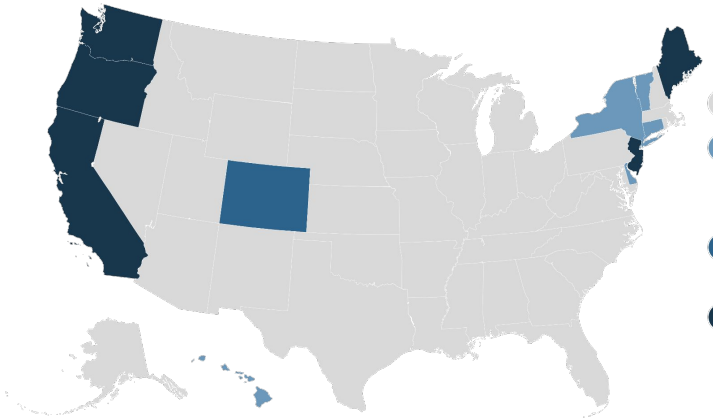
Plastic-to-Chemical Components (pyrolysis)*

Carpet-to-Nylon (depolymerization)

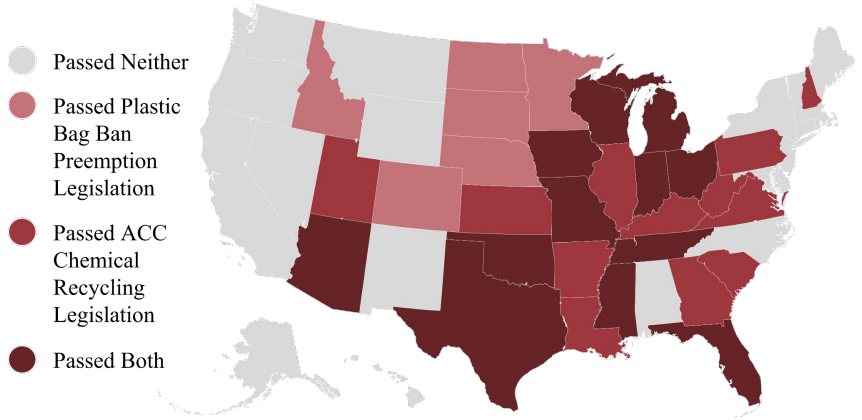
Plastic-to-Chemical Components (solvent-based)

NRDC
NATURAL RESOURCES DEFENSE COUNCIL

Diverging movements at the state level create an **uneven regulatory environment**.



- Passed Neither
- Passed Plastic Bag Ban Legislation
- Passed EPR / PCR Legislation
- Passed Both



- Passed Neither
- Passed Plastic Bag Ban Preemption Legislation
- Passed ACC Chemical Recycling Legislation
- Passed Both

Address plastic production through EPR, PCR, bans on single-use products

Promote chemical recycling by changing regulatory definitions, preempting bans

Emerging chemical recycling technologies must be fit into **existing federal regulatory structures**.

Canonical Laws

CAA	*Clean Air Act*	Air emission permits
CWA	*Clean Water Act*	Water discharge permits
RCRA	*Resource Conservation and Recovery Act*	Solid & hazardous waste regulations
SDWA	*Safe Drinking Water Act*	Public drinking water regulations
TSCA	*Toxic Substances Control Act*	New chemical manufacture & use approval

Proposed Bills

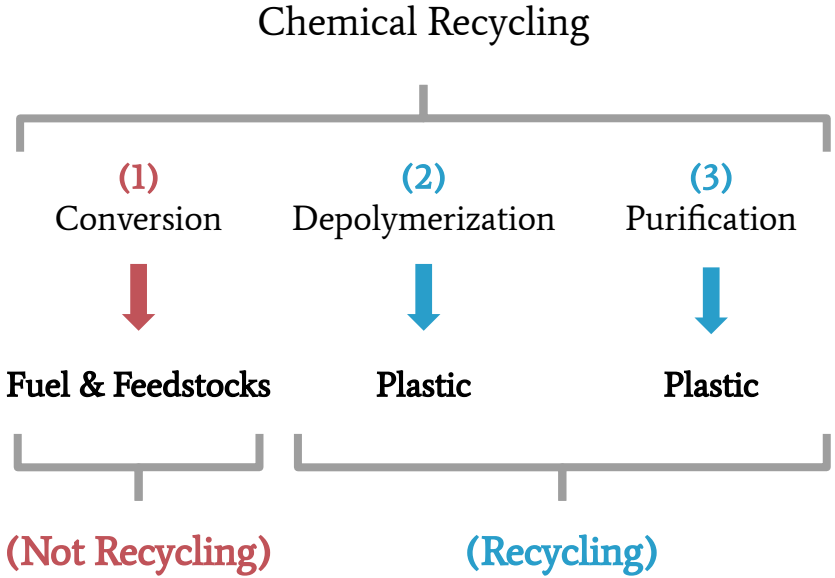
Break Free From Plastic Pollution Act (2021)	Inspired by state measures
Protect Communities From Plastics Act (2022)	Environmental justice focus

Recommendation 1

Advisory Strategy

New Federal Advisory Committee (FAC)

- Define an objective for chemical recycling technologies
- Identify sensible applications for individual processes
- Inform federal regulatory strategies and state considerations



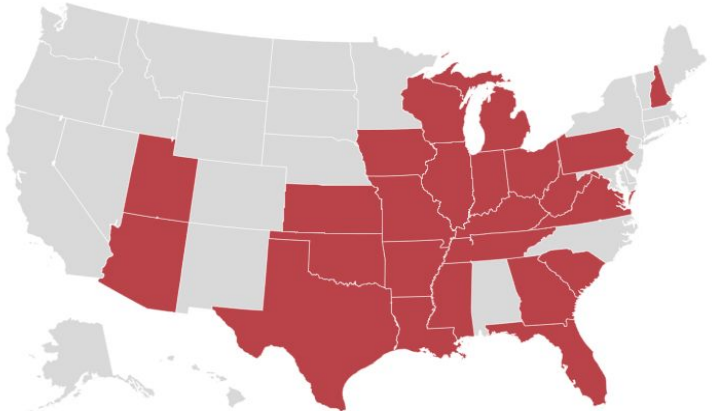
Recommendation 2

Environmental Justice

Future development of chemical recycling facilities must be closely regulated.

Further research is needed to quantify all local process impacts on environment and communities.

States Promoting Chemical Recycling



EPA

Laws
CAA, CWA, RCRA, SDWA, TSCA

FAC
National Environmental Justice Advisory Council

Recommendation 3

Complementary Policies for Chemical Recycling

State Portfolio of Plastic Production Strategies

- Extended Producer Responsibility
- Post-Consumer Recycled Content Mandates
- Bans & Charges on Single-Use & Unnecessary Plastics