

Before the House Commerce, Labor, and Economic Development Committee
Presented by Zack Pistora, Kansas Sierra Club
Opponent to SB 114
3-20-23



Dear Chair Tarwater and Honorable Members of the Committee,

On behalf of the ~5000 members of Sierra Club in Kansas, we thank you for the opportunity to submit testimony in opposition of SB 114; which would create definitions of 'advanced recycling' and exclude such facilities being regulated as solid waste processing.

'Advanced Recycling' is more like 'Advanced Incineration,' and often requires intensive energy and chemicals to work. Any 'advanced recycling' facility will more closely resemble a powerplant or refinery rather than the mechanical recycling center we know today.

To ease the public's concern on the plastic pollution crisis, the petrochemical industry is promoting 'chemical recycling' or 'advanced recycling' as a promise to reduce its waste problem. The idea is that 'advanced recycling' break down plastics – via gasification, pyrolysis, depolymerization, and solvolysis, and other processes – into their monomer components with heat, pressure, and solvents, in a low-oxygen chamber, after which the components could then be used, in principle, to make new plastic via repolymerization, creating a circular economy in plastic. However, the reality is that these processes are still underdeveloped, quite expensive, quite energy intensive, and produce toxic outputs.

A recent study, "Technical, Economic, and Environmental Comparison of Closed-Loop Recycling Technologies for Common Plastics" conducted by government energy lab researchers and published this January by the American Chemical Society's peer-reviewed journal *Sustainable Chemistry & Engineering*, demonstrated that "the economic and environmental metrics of pyrolysis and gasification are currently ten to 100 times higher than virgin polymers due to lower yields of monomers suitable for repolymerization and high energy requirements for the conversion and subsequent upgrading processes." The study went further to say that mechanical recycling, with its lower operational and capital costs, economically outcompetes all other recycling options at a statistically significant level.

There are not very many good examples of advanced recycling facilities being operational and doing what they promise.

Despite 50 years of experimentation, the technology for the economical chemical conversion of plastic is not mature and is not delivering on conversion of plastic to plastic, as there are very few of these 'advanced recycling' facilities that are operational and fulfilling its promise. According to a 2020 study by GAIA, a watchdog on incineration processes, of the of 37 chemical recycling projects advertised since 2000, only three are in operation and none of these are transforming plastic-to-plastic. Plastic-to-plastic operations are in their infancy and are not proven long-term. A 2022 report, "Recycling Lies: Chemical Recycling of Plastic is Just Greenwashing Incineration" by the Natural Resources Defense Council, found that eight facilities met the criteria of advanced recycling, most of which fell into the plastic-to-fuel category. The report points out that numerous facilities had opened and then shut down a short time later, which is consistent with other reports. The report concludes that 'of the eight selected "chemical recycling" facilities in the United States...the majority of facilities are not recycling any plastic; the facilities generate large quantities of hazardous waste; they release hazardous air pollutants; and they are often sited in communities that are disproportionately low income, people of color, or both. Given these issues, "chemical recycling" cannot be the solution to our plastic problem—no matter how the plastic industry tries to spin it.'

The report's author said in a subsequent media release that "Not only are 'chemical recycling' facilities failing at safely and effectively recycling plastic waste; they're releasing harmful pollutants into vulnerable communities and the environment. And the toxic trail doesn't end there--further pollution and health harm comes from burning the dirty fuels created in the process."

Advanced recycling still creates toxic byproducts that have to be dealt with. As such, we recommend that advanced recycling facilities must be required to do environmental impact assessments and air quality monitoring.

These processes may or may not produce a product that can be made back into plastic products, but the many of these processes, like pyrolysis, cause their own pollution and hazardous chemical emissions, including high concentrations of dioxin, furans, benzene, heavy metals (mercury, cadmium, and lead), and particulates. These toxic chemicals have are linked to multiple health concerns, from cancer to developmental issues, and organ damage. SB 114 allows for these processes to be regulated as outside of solid waste permitting and we worry that the necessary environmental assessments and air quality evaluation will not be fulfilled.

Ultimately, we feel that advanced recycling is a false solution for plastic waste because of its inefficiencies. Other approaches that aim to reduce single-use and non-recyclable plastics and/or promote plant-based materials that are easily compostable and non-toxic are the better solution to the problem for Kansas.

Plastic packaging and consumer items have been adopted for convenience, but we are realizing the full costs – including the extensive litter problem, microplastics, and the environmental problems associated with the production of petrochemicals from fracking as well as the heavy amounts of greenhouse gas emissions caused throughout the plastic life cycle. The Sierra Club feels that we shouldn't be wasting our time, let alone our taxpayer dollars, in advancing inefficient processes like advanced recycling in Kansas to address our plastic pollution problems. Instead, we'd much prefer we use our engineering and innovation expertise toward more natural, non-toxic, agricultural products for plastic and packaging alternatives. This is a way that Kansas can be a leader among states in dealing with the plastic pollution problem.

With all these concerns on advanced recycling, we'd urge you to oppose SB 114, to send this legislation to an interim committee for more study, and/or add significant guard rails like 1) no taxpayer subsidies, 2) assurances of environmental impact analyses, 3) siting standards, and a 4) a comprehensive materials reduction strategy to ensure we don't get our state into a plastic-based pitfall.

Sincerely,

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The Sierra Club is the largest grassroots environmental organization dedicated to enjoying, exploring, and protecting our great outdoors. The Kansas Chapter represents our state's strongest grassroots voice on environmental matters for nearly fifty years.

Many Facilities Built for Pyrolysis or Gasification for processing waste didn't come to fruition.



Figure 8. MSW pyrolysis facilities.

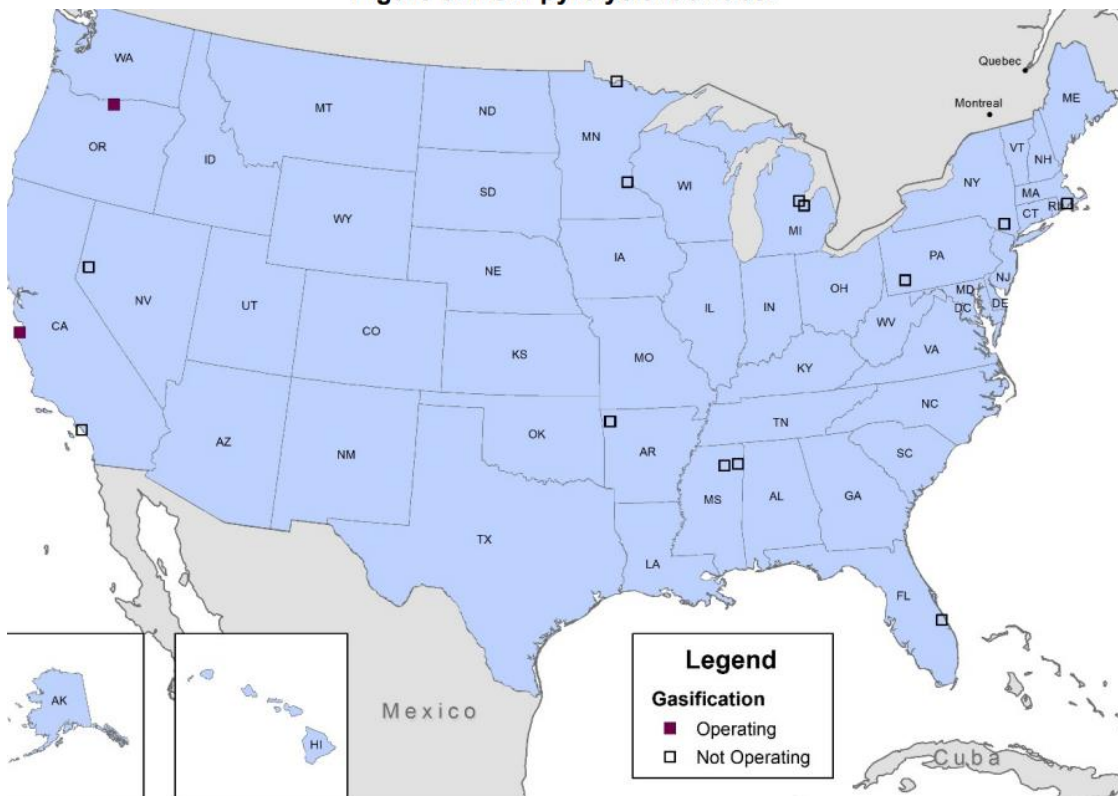


Figure 6. MSW gasification facilities.

Many Previous Pyrolysis Projects Broke Their Promise: Operating Issues, Fraud, Bankruptcy, Never Built

Table 4. Pyrolysis Facilities Operating on Plastics from MSW

Name	City	State	Technology	Feedstock	Main Product	Operating Status
Operating						
Agilyx	Tigard	OR	Pyrolysis	PS	Styrene oil	Operating. In 2013, the Tigard facility processed plastics to crude oil. It went dormant. In 2018, it reopened a 10 ton/day capacity facility for converting polystyrene to styrene oil. ⁵⁴
JBI / Plastics2Oil	Niagara Falls	NY	Pyrolysis	HDPE, LDPE, PP	Fuel oil #2, fuel oil #6	Operating at limited production of its 22 ton/day capacity as of August 2018. ⁵⁵ In 2014, the facility suspended its plastic processing and fuel production operations. ⁵⁶
Nexus Fuels	Atlanta	GA	Pyrolysis	HDPE, LDPE, PP, PS	Gasoline, diesel Gasoline	Operating on a discontinuous basis. Has a stated capacity of 50 tons/day.
Renewlogy	Salt Lake City	UT	Pyrolysis	Mixed plastics	Naptha, diesel fuel, kerosene, light fuels	Has a stated capacity of 10 tons/day. Operations paused for most of 2019 as the facility upgraded its preprocessing equipment. ⁵⁷
In Development						
Brightmark Energy/ RESpolyflow	Ashley	IN	Pyrolysis	Mixed plastics	Naptha, diesel fuel, waxes	Under construction which began in 2019. ⁵⁸ In the planning phase since 2015. In 2018, the Steuben County Board of Commissioners loaned RES Polyflow
						\$1.5 million and offered them a 10-year tax abatement for the facility to be built near Ashley. ⁵⁹
Renew Phoenix/ Renewlogy	Phoenix	AZ	Pyrolysis	Mixed plastics	Naptha, diesel fuel, kerosene, light fuels	In the planning stage for a facility in Phoenix, AZ. Expected to be operational in 2020. In 2019, the Phoenix Public Works Department chose Renew Phoenix for a 10-year contract. ⁶⁰ Renewlogy was awarded a grant through the Arizona Innovation Challenge. ⁶¹
Rialto Bioenergy	Rialto	CA	AD and pyrolysis	Food waste, municipal biosolids	Biochar (fertilizer)	Under construction. The anaerobic digester is expected to be operational in 2020. ⁶² Pyrolysis unit included in design.
Not Operating or Unknown Operating Status						
Climax Global Energy	Blackwell	SC	Pyrolysis	Mixed plastics	Syncrude, petrochemicals	Never started operations and defaulted on its rent to Barnwell County.
Envion	Derwood	MD	Pyrolysis	n/a	n/a	Never built. In 2012, Envion owner, Michael Han was convicted of fraud. ⁶³
GEP Fuel & Energy	Camden	IN	Pyrolysis	Mixed plastics	Diesel fuel	Not built. Planning began in 2016.
Green Power Inc	Pasco	WA	Pyrolysis	n/a	n/a	Not operating. In 2009, Washington State ordered it to stop because it lacked the necessary air-quality permits. ⁶⁴ In 2015, the CEO, Michael Spitzauer, was convicted of fraud. ⁶⁵
International Environmental Solutions	Romoland	CA	Pyrolysis	n/a	n/a	The pilot facility ceased operations in 2010. In 2012, International Environmental Solutions declared bankruptcy.
New Hope	Tyler	TX	Pyrolysis	HDPE, LDPE, PP, PS	Fuel oil #2, fuel oil #4	Unknown.
Oneida Seven Generations Corporation	Green Bay	WI	Pyrolysis	n/a	n/a	Not built. In 2018, the City of Green Bay will pay the Oneida Seven Generations Corporation \$2.5 million in a legal settlement. ⁶⁶
Vadxx	Akron	OH	Pyrolysis	Mixed plastics	Diesel oil, naphtha, syngas, waxes	Not operating. Operated a bench scale model for a short time in 2017. ⁶⁷

MSW, municipal solid waste; n/a, not applicable, HDPE, high density polyethylene; LDPE, low density polyethylene, PP, polypropylene; PS, polystyrene

Previous Gasification Projects for Waste-to-Fuel Failed & Some Wasted Taxpayers' Money

Table 3. MSW Gasification Facilities

Name	City	State	Technology	Feedstock	Main Product	Operating Status
Operating						
Enerkem ³⁵	Alberta	Canada	Gasification	MSW	Ethanol	Operating 350 ton/day capacity facility.
Sierra Energy	Monterey	CA	Gasification	MSW	Syngas to electricity to diesel	20 ton/day capacity demonstration facility at Fort Hunter Liggett. ³⁶
In Development						
Fulcrum BioEnergy, InEnTec, LLC	McCarran	NV	Gasification	MSW	Syngas to diesel and jet fuel	Under construction. In September 2014, Fulcrum received a \$105 million loan guarantee from the USDA as part of the Biorefinery Assistance Program. The feedstock processing facility, phase 1, has been operating since 2016. Construction of the biorefinery, phase 2, started in May 2018. The plant is expected to be operational in 2020. ³⁷
Not Operating or Unknown Operating Status						
Alter NRG	Madison	PA	Gasification	MSW	Syngas	Demonstration facility was retired in 2014. ³⁸
Cirque Energy LLC	Midland	MI	Gasification	MSW	Syngas to electricity and steam	Not built. The project was cancelled in 2012 due to market uncertainties. ³⁹
Enerkem	Inver Grove Heights	MN	Gasification	MSW	Ethanol	Planning (anticipated construction 2020) ⁴⁰
Enerkem	Pontotoc	MS	Gasification	MSW	Ethanol	Not built. In 2010, DOE awarded \$50 million in cost share funding to Enerkem, Inc. for the final design, construction, and operation of a proposed Heterogeneous Feed Biorefinery Project ⁴¹
Entech Renewable Energy	Huntington Beach	CA	Gasification	n/a	n/a	Not built. In 2013 the project was placed on an indefinite hold due to economic and financial constraints. ⁴²
InEnTech/WM	Arlington	OR	Gasification	MSW	Hydrogen	Not operational. ⁴³
Ineos	Vero Beach	FL	Gasification	MSW, biomass	Ethanol	Ceased operations in 2016 ⁴⁴ . Received \$125 million in federal grants and guaranteed loans. In 2012 the facility came online but had limited production due to technical challenges. ⁴⁵
Taylor Biomass	Montgomery	NY	Gasification	MSW	Syngas to electricity	Not built. Seeking funding and in the conceptual phase since 2000. ⁴⁶
Westinghouse /Coronal/Alter NRG	International Falls	MN	Gasification	n/a	n/a	Not built. Planning began in 2008 and included more than \$5 million for a feasibility study funded by US DOE and the Minnesota Pollution Control Agency. ⁴⁷
Ze-Gen	New Bedford	MA	Gasification	MSW	Syngas	Pilot facility closed in 2010. ⁴⁸