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RE: Exploring Advanced Recycling's Role in Achieving a Sustainable Plastics Economy

Dear House Climate, Energy and Environment Committee:

I am writing on behalf of the Baker Institute for Public Policy, Center for Energy Studies, the #1 globally ranked nonpartisan think tank, and as a member of the Recycling Science Council (RSC). RSC is a group of independent experts from universities, research organizations, government labs, and consultancies. Our goal is to provide expertise and clarity on important environmental and performance aspects of emerging recycling technologies for the benefit of stakeholders, including municipal solid waste experts and managers, policymakers, and users of recycled content. Our Council members have come together to help bring clarity and context to the current science, questions, and innovations that are being proposed as recycling solutions – and we would like to be an ongoing resource to you and the House Climate, Energy, and Environment Committee.

Plastic is a versatile material that helps Oregonians live more sustainably. From semiconductors and medical devices to alternative energy infrastructure and next-generation mobility solutions to protective gear for athletes and first responders, plastics enable high performance, efficiency, and durability, driving economic growth and technological progress.

Oregon has been a pioneer in setting ambitious goals for waste reduction, recycled content, and, more recently, Extended Producer Responsibility. Each of these policies can help advance the ultimate goal of more sustainable, circular production. Unfortunately, many essential multi-material plastics that will continue to be used, including many types of packaging, cannot be mechanically recycled in Oregon today. As a result, many are ultimately destined for landfill or incineration, resulting in lost economic and material value. Even with fully optimized reuse, repurposing, and reduction, substantial volumes of complex and difficult-to-recycle plastics will inevitably require disposal. Thus, new resource recovery solutions will remain necessary, making chemical recycling a complementary pathway to a circular economy for otherwise non-recyclable plastics.

Innovative recycling technologies, such as those described in HB 2960, are essential for achieving Oregon's plastic waste management and producer responsibility goals. Because these technologies break down plastic waste into its original building blocks for reuse in new chemicals, virgin-grade plastics, and other products, these technologies can be flexibly applied to deliver distinct environmental, social, and economic performance outcomes necessary to process specific plastic types.

These various advanced recycling technologies offer the ability to convert a wider range of plastics than through mechanical recycling alone, and they can optimize processes to accommodate variations in the feedstock. Unlike mechanical recycling, chemical recycling minimizes polymer degradation, allowing plastics to be converted into high-value feedstocks for high-quality applications in diverse industries and sectors, ensuring greater material retention in a circular economy.

Stakeholders are understandably interested in operational issues such as energy utilization, potential emissions, and community impacts. To answer those questions, a range of initiatives are in place or underway to provide clear and balanced answers. ASTM standards have been developed to provide material and/or mass balance accounting. And, a relatively new development has been the creation of "Responsible Production Guidelines for Advanced, Chemical and Molecular Recycling" (https://usplasticspact.org/responsible-production-guidelines-for-acm-recycling/). Stakeholders from across the advanced recycling value chain participated in the development of these guidelines, which have been reviewed by a number of non-governmental organizations.

When developed thoughtfully, chemical recycling can meaningfully advance sustainability, circularity, and waste avoidance objectives by redirecting plastic waste streams from landfills or incinerators, instead converting them into virgin-quality plastics and other materials that can be continuously recirculated.

Chemical recycling has been criticized by some for having the potential to produce fuel from plastic waste. While plastic waste-based fuel would reduce the consumption of fossil-based fuel, those fuels would generally fall outside the principles of a circular economy as they result in one-time energy consumption. Given the substantial energy and resource inputs required for plastic production, disposal represents a significant loss of embodied energy. Chemical recycling mitigates these losses by breaking down plastics into their constituent molecular components, enabling reintegration into manufacturing and reducing reliance on hydrocarbon resources for new plastic production. This process preserves both material and economic value, extends the useful life of plastics, and lessens dependence on fossil-based resources, thereby contributing to a more circular and resource-efficient economy.

From a life cycle sustainability perspective, chemical recycling can demonstrate avoided impacts across environmental, economic, and social dimensions—such as reducing plastic leakage, avoided emissions, creating new markets for recycled plastics, and driving regional economic development. The objective is to balance benefits and risks for long-term viability, not to eliminate impacts or prematurely exclude technologies that could expand and redefine plastic life cycle solutions.

While chemical recycling offers potential benefits, those technologies in earlier stages of development should have the opportunity to demonstrate they have evaluated key challenges, including energy and resource demands, material recovery efficiency, emissions, cost-effectiveness, product quality and safety, affordability, and community impacts. Due diligence is essential to ensure that high-performing, safe, circular *and* sustainable technologies and materials are scaled. Policy is needed that encourages technologies to address data gaps—particularly regarding environmental and public health impacts—rather than banning the technology at the outset. This will build transparency, foster public trust, and advance responsible innovation in chemical recycling.

Like all technologies aimed at transforming material flows, innovations follow a trajectory of development, refinement, and optimization. They evolve through continuous research, real-world deployment, and iterative improvements, requiring time and investment to address operational efficiencies, system-wide impacts, and health and safety considerations. These should be viewed as opportunities to address current shortcomings, with policies to ensure that new technologies are safe, efficient, and effective. Rather than rejecting these innovations outright, a measured approach is needed—one that supports investment, research, and responsible deployment to close knowledge gaps. A pragmatic and science-based approach to technological innovation recognizes that progress takes time.

Plastic management strategies should promote a holistic systems framework that drives innovation and continuous improvement throughout the life cycle. Rather than limiting efforts to more easily recyclable plastics, solutions must account for the full range of materials reaching end-of-life—now and in the future. Achieving this requires a long-term, science-driven strategy that balances technological advancement with safety, performance, and market viability. This means encouraging innovative technologies, such as chemical recycling, while ensuring rigorous oversight of the potential environmental, health, and safety impacts.

Real progress in a circular economy requires a comprehensive approach that supports consumer education, supply chain coordination, improved collection and sorting infrastructure, robust secondary markets for recycled plastics, and product design that reduces material complexity to enhance recyclability—all supported by practical, life cycle-based policies that drive long-term sustainability.

Sincerely,

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