



## Executive Summary

This report offers a vision and roadmap – our ‘blueprint’ – for the Pacific Northwest to transform its increasingly outdated solid waste management system by 2040, at a time when waste leaders are grappling with the most profound set of challenges they have faced in forty years.

The blueprint centers on a new ‘Clean Materials’ system to improve on and supersede today’s solid waste management system. Clean Materials is analogous to ‘Clean Energy,’ in that it combines both big improvements in health and environmental performance with great opportunities to grow jobs, businesses and industry.

The 2040 Clean Materials blueprint is animated by an inspiring vision: To build a world-class Clean Materials infrastructure and economy that by 2040 shrinks the Northwest’s environmental footprint dramatically while creating tens of thousands of good jobs, hundreds of new and expanding businesses, and new opportunities for clean production and industry throughout the region.

The starting point for the blueprint is the intensifying crisis facing solid waste management. At least four big challenges are driving transformation of the waste sector – the failure of waste prevention strategies to actually prevent much waste; the collapse of markets for recycled materials; radical changes in packaging and other waste stream components; and a new recognition that most damage to the planet and our health happens before, rather than after, our stuff becomes waste.

Recycling is a key touchpoint for the public. The public loves recycling. For many people it is a tangible and important way for them to act in their daily lives to do right by their planet and their community. And for the past thirty years, the recycling system has worked pretty well. But our recycling system grew increasingly reliant on exporting our recycled wastes, which made us vulnerable to changes in the export markets.

That vulnerability suddenly came to the fore in 2017 when China, for years the world’s leading destination for plastic and paper scraps, changed course. China instituted policies to ensure that recyclables they import are clean and uncontaminated by other materials, as when plastic bags are mixed in with recycled paper streams. Other Asian nations soon followed China’s lead to require clean recyclables. As a consequence, suppliers of recycled materials today are selling into a global market where demand has quickly and dramatically shrunk. Prices that Northwest jurisdictions receive for recycled

materials have plummeted sharply, wreaking havoc on the economics of recycling programs. Many jurisdictions are making the wrenching decision to eliminate recycling categories, such as glass and plastic bags, that the public is accustomed to recycling, in order to prevent contamination of other recyclables and control costs.

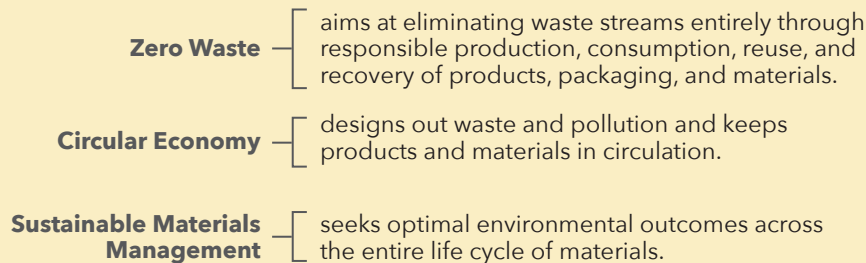
Recycling may be the most visible challenge, but not necessarily the most profound. One very important challenge is the failure of waste prevention – the top priority in current waste management law. Prioritizing waste prevention makes sense – after all, the most sensible way to reduce the health and environmental harms caused by waste, and the economic costs, is to prevent waste in the first place. But the persistent fact is that waste volumes in the past two decades are not declining, but instead persist. And radical changes in packaging and other wastes are creating new intractable challenges for waste prevention and recycling programs.

Perhaps the most profound challenge for solid waste management may be the growing recognition that most of the health and environmental damage caused by our stuff happens before we recycle or toss it out as trash. Increasingly, our best science is telling us that much greater damage happens earlier in the life cycle of products and packaging – when materials are extracted, processed, transported, and forged into products – than after they are discarded by users to enter the waste management infrastructure.

Today’s solid waste management framework is not well-suited to solve today’s challenges – or tomorrow’s. We need a broader framework that moves up the value and supply chains, where most waste is generated and most damage to human health and the environment originates. It is here that we can design out waste, design for reuse or recycling, and avoid unnecessary costs and harm in the first place.

Arguably, the two most urgent challenges are global climate change and the loading of toxic chemicals in human bodies. Tackling these two urgent crises will require strategies that span the life cycle of our products and materials.

## New paradigms are emerging to address these challenges more broadly:



*Commonalities and contrasts between the three are illuminated in Chapter 3*

This report proposes a unifying concept – Clean Materials infrastructure – which aims to conserve resources and recirculate materials to minimize environmental and cost impacts and maximize social and economic benefits. As with Clean Energy – a concept that inspired Clean Materials – keys to success are efficiency, conservation, clean resources, and clean processes that minimize harmful impacts.

The Clean Materials blueprint also proposes a core metric to measure progress, the Clean Score, built on the emerging science of life cycle assessment. As with nutritional labels on food, we need environmental truth-in-labeling for products. Transparency of life cycle impacts, specific to each product, will create the essential information needed to easily see which options are best for people and the environment. We recommend that the initial version of Clean Score center on scoring the climate footprint of products, along with a toxicity 5-point color scale – best-to-worst gradations of green-yellow-red. Products that attain a good clean score for climate and a low-toxics footprint will tend to do well in reducing other environmental impacts as well.

To build a world-class Northwest Clean Materials infrastructure, our blueprint proposes a new policy framework that is detailed in Chapter 4. The blueprint presents this policy framework under these key elements:

- Five Big Goals to achieve a world-class system by 2040 and measure our success along the way.
- A new metaphor to replace the traditional waste management hierarchy, a four-facet Diamond of interactive Clean Materials solutions.
- A set of five cross-cutting policies to accelerate effective Diamond solutions.

## Five Big Goals

To put the Northwest on the right trajectory to build a truly world-class Clean Materials economy, policymakers will need to take the lead and act boldly by putting Clean Materials on policy par with Clean Energy. Both Oregon and Washington have adopted big goals and clear targets for clean energy and climate pollution, and those goals and targets have driven real action and created real jobs.

The 2040 blueprint for Clean Materials leadership calls for major new statewide framework legislation to comprehensively refresh and supersede the solid waste and recycling legislation of the past.

It offers 5 Big Goals that constitute the ultimate success metrics for the legislation. The first two Goals are the highest-level outcomes that define environmental and economic excellence in the Clean Materials system in 2040. The next three are key strategic Goals to drive progress toward the high-level outcomes:

**Goal 1:** Shrink the Health and Environmental Impacts of our Stuff by 80%

**Goal 2:** Build a World-class Industry-Jobs Cluster in Clean Materials Solutions

**Goal 3:** Cut Discards by Half, Recycle Most of the Rest

**Goal 4:** Invest in Local Clean Materials Infrastructure, R&D and Jobs

**Goal 5:** Export Clean Materials Solutions Globally

## Better Solutions Through a Diamond Approach

The solid waste management “hierarchy” was enshrined in 1970s-era framework legislation in Washington, Oregon and many other states. This hierarchy prioritizes, in order: waste reduction, reuse and repair, recycling and composting, recovery typically through energy generation,

and finally, disposal. But this approach has three chronic problems that make it ripe for a rethink:

**First**, the solid waste hierarchy has failed to deliver the greatest share of the waste sector's effort into its highest priorities, such as waste prevention.

**Second**, this hierarchy steers us to think in silos and devise programs in separate categories. But these solutions often overlap and complement each other. Strategies developed in silos may not get the best economic and environmental benefit for the buck.

**Third**, the hierarchy can limit solutions by framing the problem to be one of solid waste alone, downplaying the importance of higher-order goals such as conserving resources, preventing toxics and reducing pollution.

To refresh the waste hierarchy, our blueprint proposes a different metaphor to guide the greatest share of resources to flow into the most effective solutions strategies, the **Clean Materials Diamond**. Diamond solutions, like the multiple points of a diamond, contain interconnected, essential facets of an integrated whole – not ranked one above the other.

The four facets of the solutions Diamond, and their elements, are:

→ **Prevent Waste at All Stages**

- Incentivize product redesign
- Prevent food waste
- Support sustainable consumption and ban wasteful products

→ **Get Longer Life and More Use from Products**

- Share products
- Re-use products
- Repair and refurbish products

→ **Optimize Recycling**

- Measure success based on actual recycling
- Clean up recycled material streams
- Redesign collection and processing systems

→ **Develop Clean Production and Processing Hubs**

- Feed clean materials into clean production hubs
- Adapt 'industrial symbiosis' to make wastes into feedstocks
- Build biorefineries and the bio-economy

Chapter 5 shows what a world-class Clean Materials system can look like in 2040, including many examples of Diamond solutions working in the Northwest and beyond.

## Cross-Cutting Policies To Accelerate Diamond Solutions

The blueprint also proposes a set of 5 key cross-cutting policy elements to get the region on the right trajectory to achieve the Five Big Goals for 2040:

**Extended Producer Responsibility 2.0** – Extended Producer Responsibility (EPR) is a breakthrough policy system that ensures producers of goods are responsible to fund and manage systems to recycle and dispose of their products when people are done with them. This takes the financial burden off municipalities, and places it on producers, who typically join together in product categories to collect and manage the discards. Our neighbors to the north in British Columbia are global leaders in successfully implementing a comprehensive EPR system that is achieving impressive recycling results. This Clean Materials blueprint proposes that Oregon and Washington policymakers build on the best of EPR recycling programs to adopt more comprehensive, next-generation EPR 2.0. EPR 2.0 will require producers not simply to improve recycling, but to optimize across all four Clean Materials Diamond solutions to deliver continuous improvement in Clean Scores.

**Standardize and Scale Clean Score Transparency** – A lynchpin of the Clean Materials framework is Life Cycle Assessments (LCAs) that are comprehensive, standardized, comparable, ubiquitous and therefore cheap. LCAs track environmental impacts of materials in products from resource extraction through processing, production and delivery. In a fully realized Clean Materials system, LCAs are standardized and required for all products and packaging sold in the Northwest, expressed in Clean Score labeling. Focused upfront investment by Washington and Oregon, perhaps in partnership with California and BC, will be needed to stand up LCA protocols and practices within five years. The blueprint proposes options to make that happen.

**West Coast Clean Materials Alliance** – To maximize positive and lasting impact from spending and investment in Diamond solutions, the blueprint recommends establishing a West Coast Clean Materials Alliance (WC-CMA), modeled on the Northwest Energy Efficiency Alliance (NEEA). NEEA accelerates the impact of energy efficiency investments in the Northwest's electricity sector by serving as a vehicle for multiple utilities to pool dollars. WC-CMA will pool dollars from multiple agencies to pursue Clean Materials 'market transformation' opportunities in Diamond solutions. The goal is to achieve greater lasting impact and benefits for funder dollars than individual agencies could achieve on their own. WC-CMA could launch as a partnership of Oregon and Washington, but it can achieve greater market impact by inviting an alliance that includes California and British Columbia.



**Buy Clean** – California’s first-of-its-kind ‘Buy Clean’ legislation sets minimum standards for key categories of building materials – carbon steel rebar, structural steel, flat glass, and mineral wool insulation board – used in state construction projects. Bidders are required to submit Environmental Product Declarations that disclose and meet benchmarks for life cycle carbon impacts. Buy Clean legislation is under consideration in Oregon and Washington as well. So far, California’s Buy Clean focuses on life cycle carbon emissions, but it could be extended to other areas such as toxics. The next wave of Buy Clean strategies will build on this first groundbreaking legislation to expand Buy Clean to many more state purchasing product categories; establish Clean Score performance targets that improve steadily over time; and form Buy Clean buyers’ clubs that aggregate purchasing power and incentivize local governments, companies, institutions, and residents to Buy Clean.

**Clean Materials Industry-Jobs Action Strategy** – A critical component of the Northwest Clean Materials 2040 vision is that it supports tens of thousands of good jobs throughout the region. The Northwest can become a global leader in the Clean Materials economy, and thrive economically by fostering dense clusters of innovative manufacturing and service businesses that grow investment, revenues, and tens of thousands of new jobs delivering Diamond solutions. A Clean Materials cluster that builds excellence regionally can become a traded sector selling to other regions and the world. To direct activity and investment toward Clean Materials industry and jobs, the blueprint recommends robust, 18-month statewide efforts to create a comprehensive state Clean Materials industry-jobs strategies in Oregon and Washington. Chapter 6 frames and proposes key elements for a Northwest Clean Materials industry-jobs strategy.

