

# Sustainable Consumption and Production

## Report and Two-year Workplan

September 2021



THE BUREAU OF  
**PLANNING &  
SUSTAINABILITY**

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# Table of Contents

<b>Introduction</b>	<b>5</b>
Equality versus equity in the climate crisis	5
A fuller perspective for carbon accounting	6
<b>Implications of COVID-19 and the associated economic recession</b>	<b>7</b>
<b>Purpose</b>	<b>7</b>
<b>Consumption-based emissions are double emissions produced locally</b>	<b>9</b>
Consumption-based emissions use Life Cycle Assessment (LCA) to understand the global impacts of consumption	11
Government’s role is to shift the systems that drive unsustainable consumption	12
Overconsumption is particularly prevalent in urban environments and requires local government leadership	14
More consumption has not led to individual happiness and well-being	16
Economic growth does not necessarily lead to happiness or improved quality of life	17
Local outcomes from economic growth	19
<b>A vision forward: <i>Doughnut Economics</i></b>	<b>20</b>
<i>Doughnut Economics</i> ’ proposed role of government	22
The call for a regenerative economy	23
<b>BPS strategies and proposed actions to reduce consumption-based emissions</b>	<b>25</b>
Sustainable Consumption and Production Vision	26
Sustainable Consumption and Production Goals	26
Outcomes	26
BPS strategies and actions by category	27
SC&PR workplan measures of success	39

SC&PR communications plan	41
BPS leadership for the SC&PR	41
Implications for local solid waste management	42
<b>Contact</b>	<b>43</b>

# Introduction

The climate crisis dominates the headlines with dire warnings for the future. Risks have rapidly increased for severe weather events, heat-related mortality, wildfires, water scarcity, collapse of the global food system<sup>1</sup> and sea level rise. These risks could render delta and low-coastal regions, where two-thirds of the world's population live, uninhabitable.<sup>2</sup> Without intervention, millions of people will die<sup>3</sup> and billions more will be permanently displaced.<sup>4</sup>

The United Nations Intergovernmental Panel on Climate Change (IPCC) released a special report in October 2018 that reiterated the need to limit global warming to 1.5°C to avoid the worst consequences of climate change.<sup>5</sup> The IPCC projects that limiting warming to 1.5°C will require an unprecedented transformation of every sector of the global economy in the next 10 years. The IPCC called for a 50% reduction in global carbon emissions by 2030 and net-zero carbon emissions by 2050 to have the best chance of limiting warming to 1.5°C.

Nations have signed on to the Paris Agreement to commit to these targets. Cities around the world, including Portland, are making local commitments through organizations like the Global Covenant of Mayors for Climate and Energy and C40 Cities to achieve these targets.

## Equality versus equity in the climate crisis

International Climate policy asks all cities to commit equal emission reduction targets, even though some have generated a disproportionate share of cumulative emissions. As production has become more globalized, many western cities have outsourced their emissions to other parts of the world, reducing their domestic emissions. This effect is furthered by increasing levels of domestic consumption, which drives more emissions from production in other parts of the world. A more equitable approach would account for the outsized role cities in developed countries have played in bringing climate change to the point of crisis. Within developed countries, cities, businesses, industries and middle- to upper-class households have contributed the most to climate change, yet low-income communities, particularly communities of color, and those in the developing world will bear the brunt of climate impacts.

An equitable approach to climate policy needs to address emissions Portland is responsible for that occur abroad, in countries such as China or Vietnam. An equitable approach acknowledges that displacing emissions by outsourcing manufacturing jobs to other countries has hurt Portland's local community and limited the ability to control those emissions. Outsourcing also exploits communities around the world in other ways — from the mining of lithium for electric vehicle batteries that damages indigenous lands in Argentina,<sup>6</sup> to children in the Congo working 12-hour days hauling sacks of cobalt

for phone batteries,<sup>7</sup> to Cambodian garment workers making “fast fashion” clothes suffering malnutrition because of poor wages and working conditions.<sup>8</sup>

Reducing carbon emissions must be done in a way that is equitable, addresses proportional responsibility for the climate crisis, and seeks opportunities for people around the world to thrive in a low-carbon future through a “just transition.”<sup>9</sup> This means that billions of people on the planet will need to consume much more of the basic necessities than they do today. It also means that many people — particularly in highly developed cities in the United States and Europe — will need to consume less, while doing so in ways that create opportunity and improve well-being for all those we share this planet with. Well-being is defined as the state of being comfortable, healthy, and happy.

## A fuller perspective for carbon accounting

The traditional approach used by governments to track progress against net-zero climate targets, known as sector- or production-based carbon accounting, drastically underestimates carbon impacts globally. This is especially true at the local scale, as sector- or production-based emissions account only for emissions produced within a jurisdiction’s geographic boundary. This perpetuates the ineffectiveness of climate action today, as government planning and policy has been solely focused on reducing local emissions. In addition, carbon accounting alone lacks the ability to address fundamental issues of well-being and quality of life, which have both global and local implications.

By tracking and analyzing lifecycle carbon through a consumption-based emissions inventory (CBEI), governments can have a fuller perspective of the impacts of consumption and how that consumption contributes to global climate change. A CBEI is based on local consumer spending and models the global emissions based on average emissions per dollar for different commodities.

A CBEI provides a more effective way to reduce emissions by leveraging how consumer demand and improved business and industrial practices can have an outsized impact on reducing global carbon emissions. The CBEI helps create a more equitable approach, one that acknowledges that Portland’s middle class and wealthier community members have a greater responsibility to arrest emissions than

### **EQUITY**

Equity is when all individuals have access to the opportunities necessary to satisfy their essential needs, advance their well-being and achieve their full potential (Portland Plan, 2012).

Portland uses a racial equity framework that centers equity on race, such that race does not determine or predict the distribution of resources, opportunities, and burdens for group members in society.

*Source: OEHR, Citywide Racial Equity Goals and Strategies:*

<https://www.portlandoregon.gov/oehr/article/53758>

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those who face the brunt of climate change consequences around the world, including Portland’s low-income populations and communities of color.

Both methods of carbon accounting (sector/production-based and consumption-based) will be important for governments moving forward, as each helps to deepen the understanding of actions that cities must take to reduce both local and global emissions.

## Implications of COVID-19 and the associated economic recession

Work on this Sustainable Consumption and Production Report (SC&PR) began well before the 2020 COVID-19 pandemic and associated economic recession. While Portland may currently be facing higher levels of unemployment, economic uncertainty and healthcare challenges, the work presented here remains relevant.

Since the beginning of the pandemic, the slowing of the economy had significant benefits in terms of reduced environmental impacts; for example, lower carbon emissions, reduced urban congestion and air pollution. However, it would be naive to think that with economic recovery, these lower carbon results will persist. In fact, if we look at prior economic recessions, carbon emission, consumption of goods, and waste declined, but then rapidly accelerated to higher levels with recovery. In addition, many Portlanders have suffered extensively from COVID-19, with health and economic challenges that cannot simply be restored by a strong economy. As the economy recovers it will be critical for Portland to focus strategically on sustainable consumption and improving quality of life, well-being and community resilience, especially for those hardest hit by the recession and on the frontlines of climate change.

Portland’s [COVID-19 Response Values Framework](#) is strongly aligned with the goals and ideas presented in this SC&PR by centering equity and climate action in economic recovery and long-term priorities and goals. The framework reaffirms that the hardest hit community members will continue to be prioritized through both immediate relief work and longer-term recovery actions — with the goal of helping them emerge from this crisis more resilient.

## Purpose

The purpose of the SC&PR is to articulate how Portland’s Bureau of Planning and Sustainability (BPS) will prioritize efforts to reduce global carbon emissions that result from the consumption of goods and services locally. The SC&PR seeks to identify and create opportunities for the City to partner with the

community, increase well-being and help all Portlanders and local businesses to thrive within the limitations and boundaries of the planet.

The SC&PR does several things to get Portland on a path to reducing consumption-based emissions. First, the SC&PR outlines key strategies that can reduce emissions and help meet other goals, such as advancing equity, improving community resilience and increasing well-being. The strategies contained in the SC&PR are data driven and based on Portland's CBEI ([see Report Appendix](#)). The strategies are intended to be long term, transformational and associated with discrete actions to be completed over the next two fiscal years. These strategies and associated actions are a starting point for BPS, with the goal that over the next two years the work will expand across City bureaus and build in collaboration with the community and businesses.

Second, the SC&PR outlines a new path forward for local governance. It seeks to shift how we measure success away from traditional models of economic growth to measurements of equitable consumption and community well-being, all while acknowledging and dismantling historic injustice and oppression.

Third, the SC&PR reframes expectations around end-of-life materials management. It is aligned with the [State of Oregon Materials Management 2050 vision](#) because it focuses upstream to reduce environmental impacts across the entire lifecycle of materials.<sup>10</sup>

Lastly, the SC&PR uses a climate, equity and justice lens. These priorities have been specifically articulated by Portland City Council through Mayor Ted Wheeler's fiscal year ([FY 2020–21 budget](#)), the [COVID-19 Response Values Framework](#) and [2020 Climate Emergency Declaration](#). Achieving sustainable levels of local consumption and production of goods, food and materials will be critical for abating the climate crisis. However, reducing consumption-based emissions alone will not be enough. There are many other environmental and social impacts of consumption that extend beyond climate change, such as product toxicity, air and water pollution, loss of biodiversity, and global inequality, including unfair and dangerous working conditions in less developed countries.

The SC&PR is informed by Kate Raworth's framework in her book, *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist* (2017). The framework helps the SC&PR account for the broader environmental and social impacts and outline a powerful new vision for achieving sustainable consumption — what Raworth calls "the safe and just space for humanity." As BPS' work on sustainable consumption evolves, it will be important to move beyond the narrow focus on climate change and work more holistically to truly achieve sustainable consumption and production.

The SC&PR and Raworth's *Doughnut Economics* framework are as relevant in a post-COVID-19 economy as before the recession. The efforts we need to take as a city to achieve sustainable levels of

consumption, improved quality of life, well-being and resilience are even more important now as we turn toward economic recovery.

## Consumption-based emissions are double emissions produced locally

Portland published the first city-scale CBEI in the 2015 Climate Action Plan.<sup>11</sup> More and more governments are now conducting their own CBEIs to better understand lifecycle emissions. Portland's CBEI showed that *global* carbon emissions that result from local consumption of food, goods, materials and services are more than twice the emissions produced *locally* (see Figure 1). Even with the success of reducing local emissions 19% below 1990 levels,<sup>12</sup> consumption-based emissions continue to climb, increasing 9% from 2011 to 2015 (see Figure 2). This indicates that traditional climate policies and planning have failed to reduce emissions from consumption, as those emissions are unaccounted for in traditional sector-based goals. This also indicates that some of the observed sector-based reductions are likely due to outsourcing local production and the greater import of goods, food and materials.

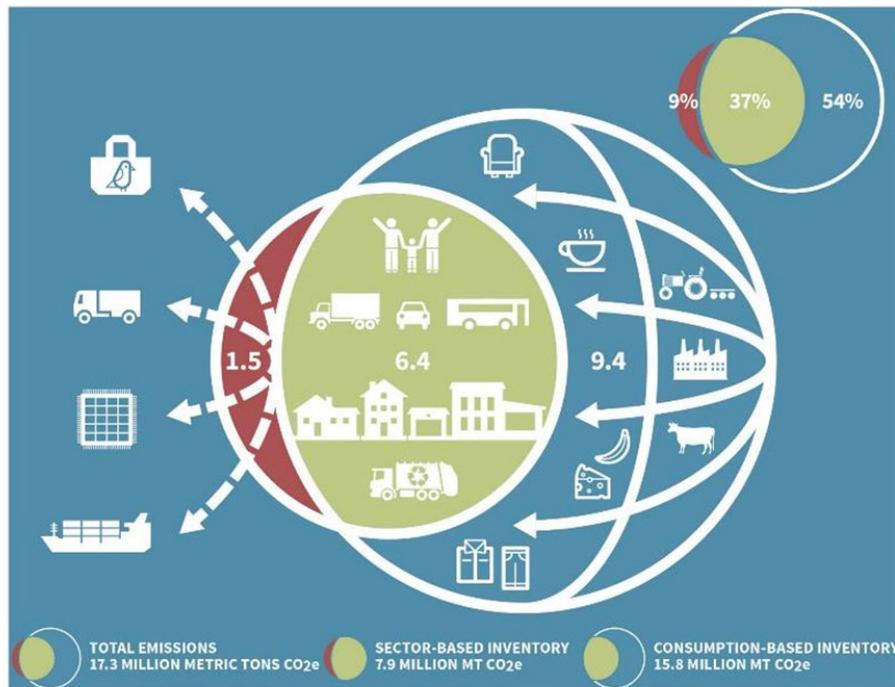


Figure 1: Multnomah County consumption-based emissions are more than twice the emissions produced within the County. This chart compares the Multnomah County consumption-based emissions inventory and the local sector-based emissions inventory to show how they overlap and differ (2011).

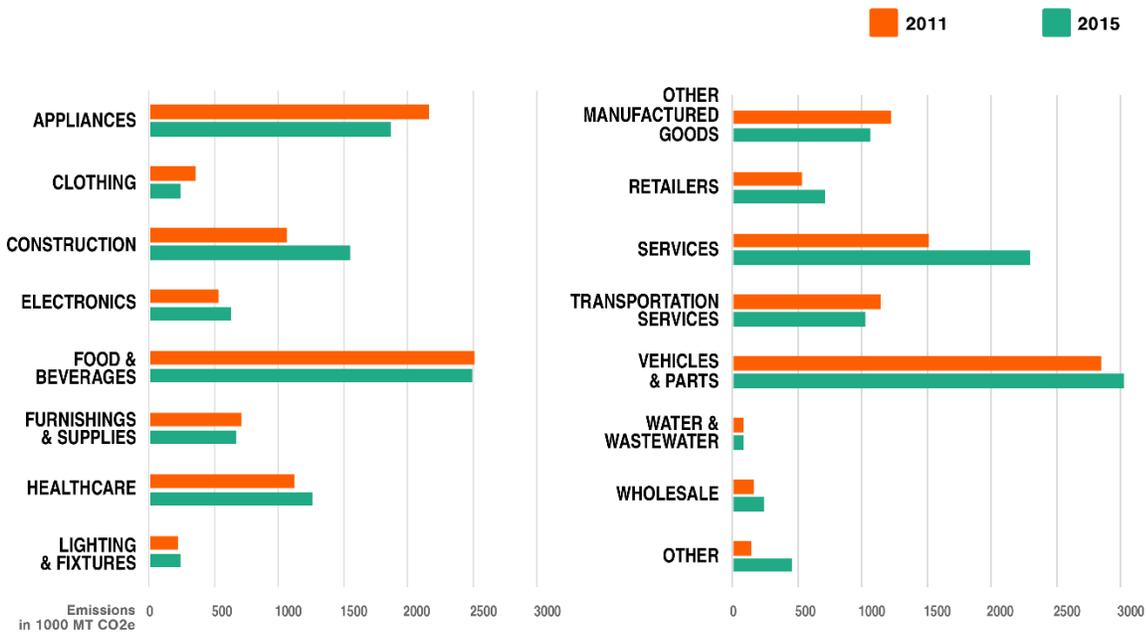


Figure 2: Comparison of 2011 and 2015 consumption-based emissions from Multnomah County by category. Source: Multnomah County Consumption-based Emissions Inventory (2011 and 2015).

The increase in Portland’s consumption-based emissions from 2011 to 2015 is mostly driven by changes in spending between post-recession 2011 and the 2015 booming economy. For example, in 2011, annual growth in the U.S. Gross Domestic Product (GDP) was 1.5%, and it increased to 2.9% by 2015.<sup>13</sup> At the local level, lifecycle emissions from the construction sector increased by 47%, as local construction activity skyrocketed post-recession. Similar trends are visible in other sectors, such as spending on healthcare, services and retail, which would be expected to increase with higher employment rates.

CBEI is based on final demand, and as spending by households and governments increases for various categories, that spending is reflected in higher emissions. With the recovery from the COVID-19 recession, emissions should also be expected to increase with spending. Without significant policy interventions, changes in business practices and shifts in consumer behavior, Portland expects to see this trend of increased spending accompanied by increased emissions continue.

In addition, the downstream results of consumption lead to landfilled waste and other pollution. Local waste reduction strategies that focus on end-of-life material management have failed to reduce overall material throughput. The amount of waste, in tons, hauled to landfills in the Portland metro area has increased 35% since 1990.<sup>14</sup> This problem requires Portland to utilize new frameworks specifically designed to refocus waste reduction efforts further upstream from the point of disposal.

Confronting and abating the climate crisis will require an unprecedented transformation of every sector of the economy by 2030. This presents an opportunity for businesses and producers to meet this challenge through innovation and fundamental changes to supply and production models. Renewable energy for production is important, but insufficient. More is needed to achieve sustainable production, such as circular and regenerative practices, extended producer responsibility, localized and resourceful material supply chains, abandoning planned obsolescence with durable and longer lasting products, and less advertising and lifestyle fashion trends that push consumers to buy more than they need.

## **GROSS DOMESTIC PRODUCT (GDP)**

Gross Domestic Product (GDP) refers to the total market value of goods and services produced within a jurisdiction's borders over a period of time, typically quarterly or annually. GDP is calculated by the US Bureau of Economic Analysis, at the National, State, County, and Metropolitan scale. In this context, GDP is a proxy for jobs and economic activity.

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## **Consumption-based emissions use Life Cycle Assessment (LCA) to understand the global impacts of consumption**

There are significant lifecycle emissions that are hidden within many products. These emissions are referred to as "embodied carbon" and are produced from upstream lifecycle phases before a consumer purchases the product. A full lifecycle assessment includes all the embodied carbon in a product plus the downstream emissions produced from use and disposal of the product, sometimes referred to as "cradle to grave." Lifecycle emissions include both the upstream and downstream emissions from:

- 1) Production, including resource extraction and processing of materials throughout the product supply chain.
- 2) Transportation, including materials used throughout the supply chain before the product is purchased by a consumer.
- 3) Use of the product.

4) Disposal of the product.

For example, to produce a washing machine, fossil fuels and metals are extracted and processed into plastics and sheet metal. Electrical components and computer chips also need to be manufactured. Those components are shipped and assembled into the final product, which is then distributed to wholesalers and retailers and finally purchased by a consumer. All those steps require energy and produce carbon emissions. Once the washing machine begins washing clothes, it directly uses energy, generating carbon emissions for the rest of its useable life.

Portland's CBEI showed that 62% of emissions resulted from the production of goods, materials and food rather than from their transportation, use or disposal (see Figure 3). Therefore, reducing the need to purchase new products and decreasing the carbon intensity of production are powerful opportunities to reduce global emissions.

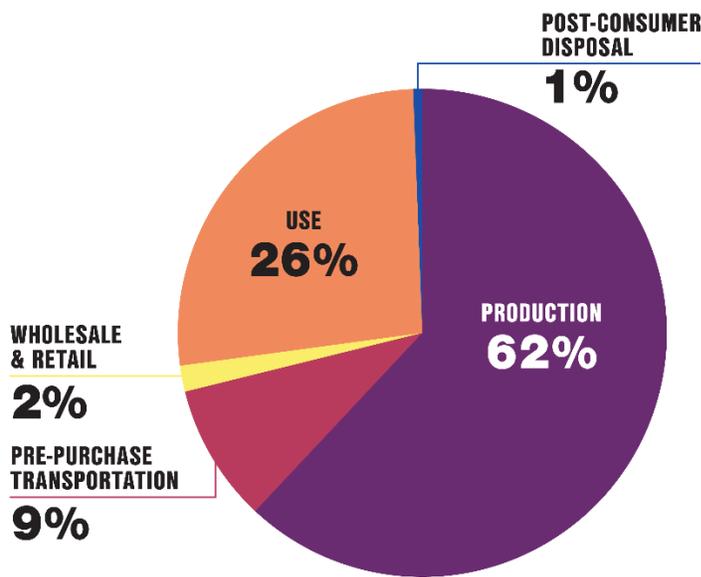


Figure 3: While emissions occur throughout all stages of a product's lifecycle, for most goods, the majority of emissions occur during production, which includes natural resource extraction, processing and manufacturing. Source: Multnomah County Consumption-based Emissions Inventory (2015).

## Government's has a role to help shift the systems that drive unsustainable consumption

Using CBEI reveals that Portlanders can reduce emissions in categories such as homes, transportation, food, goods and services, see Figure 4. For Portland to meet its emission reduction goals, individuals, businesses, other organizations and governments will need to meet their needs by reducing overall

consumption and choosing products and services with lower emissions across the entire lifecycle. This includes making informed choices about which products and services to buy as well as utilizing opportunities to rent, share, fix and reuse goods. For example, with clothing, shifting spending from the purchase of new clothes and shoes to altering and repairing existing items can help. This shift reduces the demand to produce new clothing and shoes, which reduces global carbon emissions, while creating local jobs for tailors and cobblers — jobs that are needed in the local community and cannot be outsourced.

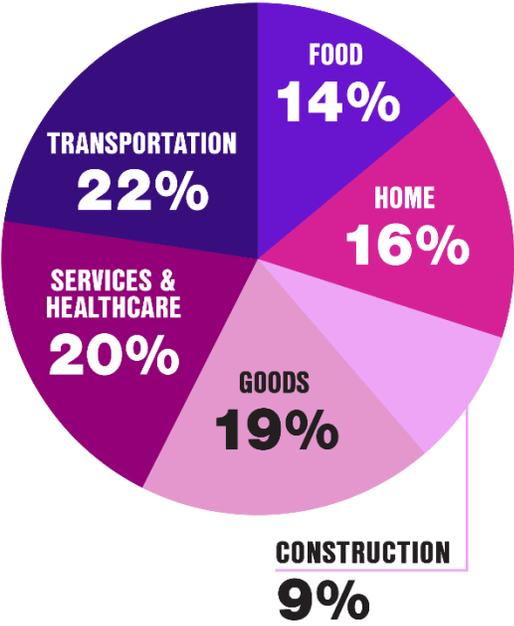


Figure 4: Multnomah County consumption-based emissions, based on consumer spending on 536 different commodities, presents a snapshot of lifecycle emissions that result from spending in a single calendar year. Source: Multnomah County Consumption-based Emissions Inventory (2015).

While individual action in these areas supports progress, we can't look to individual consumers and businesses to make a difference on the scale that is needed. While CBEI gives greater insight into how individual consumers and businesses can make a difference in less traditional ways, such as reducing meat from their diet or sharing tools, it has significant limitations. First, consumers lack the information needed to make informed purchasing decisions. For example, it would be unreasonable to expect

consumers to navigate the complexity of lifecycle assessment while comparing products at the grocery store. Second, even with the best available information, consumers have limited opportunities to shift the broader systems that produce high-carbon products (e.g., they cannot easily shift production supply chains). Consumers remain locked into systems designed to promote high-consumption lifestyles.

**“Government’s fingerprints, whether we like it or not, are all over consumption in this country.”**

— David Allaway, Oregon Department of Environmental Quality

**In fact, consumers rely on governments to make systemic changes, set the rules, provide information and to ban dangerous products and materials. In addition to regulation, governments can also influence change by convening and supporting businesses and community partners that help advance these efforts. Government has a key role in shaping the systems and conditions within which consumers and producers make decisions and has long played an important role in regulating markets and transforming systems to achieve strategic outcomes for the public good.**

In the words of David Allaway, policy analyst at the Oregon Department of Environmental Quality (DEQ),<sup>15</sup> “government’s fingerprints, whether we like it or not... are all over consumption in this country.” He states that state and local sales taxes and Federal mortgage interest tax deductions influence consumption, as do labor laws and standards and access to health insurance.

The role of local government in establishing consumption patterns is even more present in the daily lives of residents. Examples include everything from government’s provision of roads and clean water at the tap. DEQ’s Allaway notes that local economic development projects are designed to draw people to specific corridors to shop and eat. Government determines and funds transportation routes, which then support the transportation modes that shape consumption. Zoning, urban form, building codes, and environmental policies all are specifically designed to influence consumption, he states. “So, this idea that consumption is new or foreign territory, or off limits to government, is really just a myth,” he says.

## **Overconsumption is particularly prevalent in urban environments and requires local government leadership**

Economic cycles strongly influence consumption patterns, and overall consumption should be expected to rise again after the current economic recession. Prior to the recession, consumption in the United States had been ballooning for a decade. For example, in Oregon, final demand — or dollars paid for consumer goods — increased by 30% (adjusted for inflation) from 2005 to 2015.<sup>16</sup> Even accounting for

population growth, final demand in Oregon increased by 17.4% per person over the same period (again, adjusted for inflation).

With household spending increasing over this period, cities have the greatest responsibility to address the problem. As an example, in the United States, expenditures on boy's apparel decreased 15% in rural areas from 1990 to 2018; however, the same expenditures increased 25% in urban areas over the same period.<sup>17</sup> In addition, consumption is met through the extraction of raw materials and labor from rural areas, exploiting other communities to satisfy urban demand. Consumption is a uniquely urban problem that requires local leadership.

Local governments play a key role in establishing many of the choices available to consumers, and land use planning is one of the most direct mechanisms by influencing the conditions within which urban areas develop. For example, the City of Portland currently restricts development across 75% of the city to single-family homes, limiting the density of housing units.<sup>18</sup> Single-family homes are larger on a per housing unit basis and lack the energy-saving benefits of shared walls found in multi-family buildings. The consequence of larger single-family homes is not just more energy use, but also more material use — more concrete, drywall, glass, paint, carpet and furnishings and room for storage, on a per household basis. Single-family homes not only enable more consumption by middle- and upper income households, they also significantly limit the land available for a wider variety of housing options for different income levels.

Portland's Residential Infill Project (RIP) is an example of how the City is seeking to ameliorate the impacts of single-family zoning to promote equity and environmental benefits associated with density. The changes proposed by RIP allow more housing units to be built in residential neighborhoods, but only if they follow new limits on size and scale. The rule changes address concerns about rising housing costs and large new structures by requiring smaller houses that better fit existing neighborhoods and creating more housing choices that suit people's needs as they age or as their careers or lifestyles change.

RIP is a key approach to achieving more sustainable levels of urban consumption and helps to improve quality of life and well-being within the city. Public housing and land use policy are directly correlated with quality of life, particularly for the most vulnerable populations that are experiencing houselessness and poverty or those who are vulnerable to the effects of gentrification and housing displacement. Consider the zoning of housing units near freeways, railyards, or other sources of industrial pollution, which are often the homes to low-income populations or communities of color. Projects like RIP will help Portland address the social and environmental consequences of climate change.

## More consumption has not led to individual happiness and well-being

Increasingly, research has been challenging the modern economics myth that higher consumption increases happiness and well-being. Research has found that happiness is better derived from investments in experiences rather than material goods.<sup>19</sup> For lower income households, happiness from spending on experiences versus material goods was evenly split. Higher income households overwhelmingly said experiential purchases made them happier. This demonstrates that material goods can improve happiness, but only meaningfully for those with lower income levels.

Additional studies have found that when people buy things, they are more likely to suffer buyer's remorse than when they invest in experiences.<sup>20, 21</sup> They also tend to compare their material assets to others. Comparing individual material consumption to that of others further drives consumption and leads households to a constant struggle to "keep up with the Joneses."

These findings are further supported by another study that analyzed World Gallup Poll data from 1.7 million people in 164 countries. Researchers cross-referenced earnings and life satisfaction and zeroed in on a happiness tipping point where increases in individual income help improve happiness and quality of life, but only to a point.<sup>22</sup> Although the cost and standard of living varies across these countries, researchers concluded that the ideal income for individuals is \$95,000, in U.S. dollars, a year for life satisfaction and \$60,000 to \$75,000 a year for emotional well-being. (Researchers defined life satisfaction as an overall assessment of how one is doing, while emotional well-being is a person's day-to-day feelings, such as happiness.) "Money is only a part of what really makes us happy, and we're learning more about the limits of money," according to the study's lead author Andrew Jebb.<sup>23</sup>

**It's important to note that in Portland, 72% of households have incomes below \$75,000, or below the optimal income for happiness (see the pie chart in Figure 5), emphasizing the work ahead to support Portlanders who need a boost in income to improve their well-being.** On a per person basis, higher income households in Portland making over \$150,000 per year produce more than double the consumption-based emissions of households making up to \$75,000 (see Figure 5). The lowest income Portlanders, making less than \$15,000 per year, are responsible for only 20% of the consumption-based emissions of the highest income households.

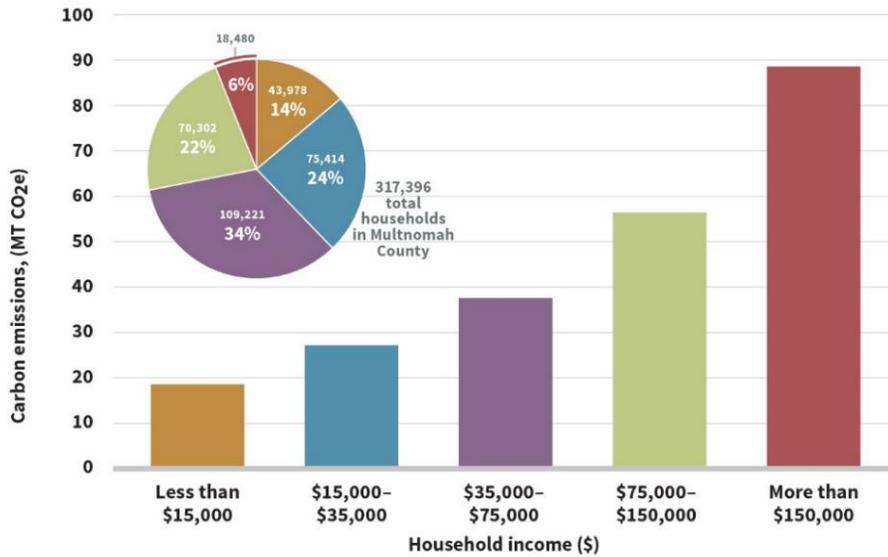


Figure 5: Average consumption-based emissions per household in Multnomah County by income and % of households in Multnomah County for different income groups. Multnomah County 2015 Climate Action Plan.

The ability for lower income households to spend more on food, goods and services, is vitally important to increase their happiness and well-being. For thousands of Portlanders to increase their consumption and still achieve carbon reduction goals, many more middle- and high-income households will need to consume less and do so in more sustainable ways. This tension demonstrates the importance of transforming the broader economy and shifting to lower carbon production practices.

## Economic growth does not necessarily lead to happiness or improved quality of life

Both GDP and personal consumption in the United States increased year over year since 2010, until the economic recession beginning in the first quarter of 2020.<sup>24</sup> However, the promises of economic growth to deliver happiness, quality of life and reduced income inequality were not realized over that decade.<sup>25</sup> Today, many people in the United States are unhappy with their quality of life and declining well-being. For example, the United Nation’s 2019 annual World Happiness Report found that Americans are the unhappiest they have been in years.<sup>26</sup> Despite a strong economy and low crime rates in 2019, the U.S. dropped in UN rankings for the third straight year, to the 19th happiest nation.

The report surveyed 156 countries using six metrics that the UN determined are indicators of happiness: GDP per capita, healthy life expectancy, the freedom to make life choices, social support, generosity, and perceptions of corruption. **America has never made it into the top 10 happiest countries.** It is worth noting that 9 of the top 10 happiest countries have higher tax rates and all 10 countries have

greater social safety net protections than the United States,<sup>27</sup> including universal healthcare,<sup>28</sup> free public education, mandated paid leave for new parents<sup>29</sup> and comprehensive pension systems.<sup>30</sup>

In her seminal book *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist* (2017), author Kate Raworth takes on the myth that continuing to grow the economy will ultimately reduce pollution, inequality and improve quality of life for all. Raworth provides numerous examples for how the promise of economic growth has not delivered on these social and environmental goals. She proposes the idea that instead of a continued exponential growth curve (see Figure 6), we should strive for an “S” curve of growth — or a more natural growth curve — that reflects that economic growth must eventually reach a limit.

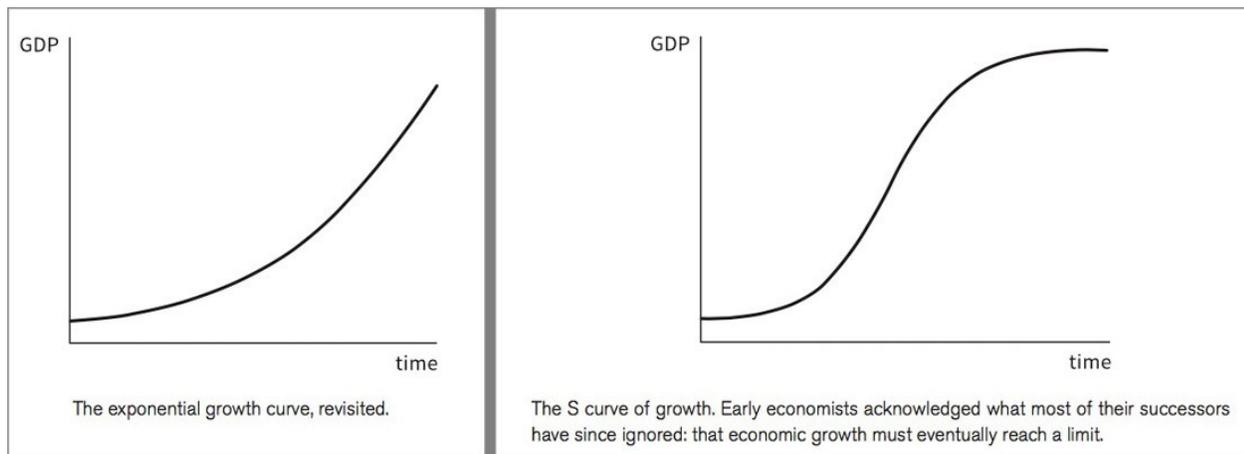


Figure 6: Comparison of exponential growth curve and “S” curve of growth. Source: *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist* (2017).

Raworth gives the example that living organisms can sustain themselves as mature and stable complex systems for very long periods of time after reaching full growth. She argues that economic growth is very important up to a point, providing examples of how developing nations, rural communities and even some urban populations, such as low income and BIPOC communities in Portland, benefit from economic growth. But at some point, there are declining returns in quality of life and well-being. Raworth’s work is discussed in more detail on page 20.

Similarly, Tim Jackson’s book *Prosperity Without Growth* (2017) looks at per-person GDP for various countries and compares them against statistics indicating quality of life and well-being, such as life expectancy, birth rates and education. In all cases, the benefits climbed quickly with increased GDP in poorer countries but tapered off drastically as GDP continued to rise. For example, life expectancy in Cuba, Costa Rica and Chile are higher than life expectancy in the United States, even though GDP per capita is four times higher in the United States. **This raises the question of whether cities should**

**prioritize economic growth broadly versus a more focused approach that centers on those who stand to benefit the most from marginal improvements in income and opportunity.**

## Local outcomes from economic growth

Setting the current recession aside, Portland's GDP has climbed 33% from 2000 levels.<sup>31</sup> This GDP growth has not impacted all people equally. Income inequality in Oregon has reached record highs, according to an analysis by the Oregon Center for Public Policy.<sup>32</sup> Since the end of the last recession from 2009 to 2016, the average income of the top one-tenth of the 1% wealthiest residents in Oregon increased by about \$1.7 million, and the average income of the top 1% as a whole increased by about \$167,000. Meanwhile, the typical Oregonian saw an increase of just \$1,600, and the income gap separating those in the middle of the income ladder and those at the very top is at its greatest: a five-fold increase since 1980.<sup>33</sup>

During the last decade, while the economy boomed, the Multnomah County poverty rate was about 16%, or about 127,000 people.<sup>34</sup> The 2019 Multnomah County Poverty report found that since 2010, as Portland became the 10th wealthiest major city in the United States and the number of households with incomes at or above \$100,000 had grown by 45%, more than a third of Multnomah County households were unable to meet their basic needs. The report also found that since 1990, the county's population in poverty grew at almost twice the rate of the county's overall population. Poverty rates for Black, Indigenous and Latinx populations were more than twice the rate for whites.

In Portland, more than 4,000 people are experiencing homelessness and sleeping on the streets or in shelters.<sup>35</sup> Even with recent policy interventions and increased housing supply, housing affordability remains a critical issue. In 2018, nearly 40% of households in Portland struggled to afford housing, with more than 30% of their income going to housing costs.<sup>36</sup> Disparities in income growth by race and ethnicity have persisted, with median income levels increasing significantly for white households.<sup>37</sup> This dynamic perpetuates the risk of displacement and homelessness citywide for residents, especially communities of color.

Meanwhile, health and well-being are declining, with Oregonians experiencing poor health outcomes. Oregon is the 22nd healthiest state, the worst in the nation for mental health illness, and the third highest for rates of substance abuse.<sup>38</sup> Some Portlanders do not have consistent and affordable access to healthcare, food, energy or education, let alone the resources for new clothes or a computer. The COVID-19 crisis has heightened these inequities for communities of color, who are experiencing increased health impacts from coronavirus infections, lack of access to digital tools such as computers and internet access, and food insecurity. All of these inequities are compounded for children of color, who were profoundly affected by COVID-19 school closures.

For too many, basic well-being and safety are still in question. Clearly the benefits of economic growth are not experienced equally across the community. **Economic growth alone is insufficient to reduce**

**income inequality, poverty and housing displacement, nor does it improve health outcomes, let alone reduce carbon emissions.**

Without urgent interventions and better social safety net protections, the devastation brought by COVID-19 has the potential to drive many more Portlanders into poverty and houselessness. What is to stop the next economic boom from perpetuating the same disparities in income, wealth and carbon emissions? A new, more equitable approach is needed to reduce environmental harm from climate change, while enabling communities to thrive in a low-carbon future.

## A vision forward: Doughnut Economics

In *Doughnut Economics*, Kate Raworth lays out a new framework for the economy and a new way to visualize the goal of prosperity. This framework gives local governments a starting point to conceptualize sustainable consumption and see who benefits, who is burdened and where to focus action and opportunity. Portland used the *Doughnut Economics* framework to develop this Report and is participating in a project with Raworth through C40’s Thriving Cities Initiative, described in the [Report Appendix](#).

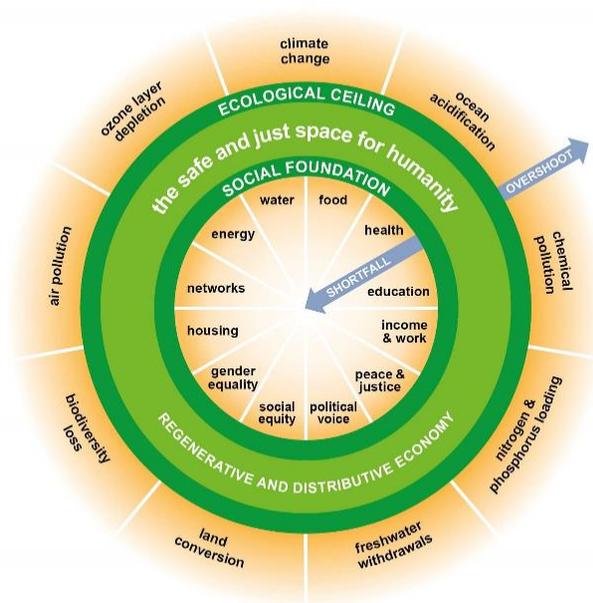


Figure 7: Diagram showing the safe and just space for humanity rests between a social foundation and an ecological ceiling. Source: *Doughnut Economics: Seven Ways to Think Like a 21st Century Economist* (2017).

The *Doughnut Economics* framework is as visual (see Figure 7) as it is pragmatic. It is a “radically new compass for guiding humanity this century. And it points towards a future that can provide for every person’s needs while safeguarding the living world on which we all depend,” according to Raworth.

Portland’s goal for sustainable consumption is to bring and keep the community within a “safe and just space for humanity.”

The *Doughnut Economics* model focuses on two different areas of consumption — overshoot and shortfall. The “overshoot” area represents a high level of consumption, and by extension, the consumers who are using resources beyond the earth’s ecological boundaries.<sup>39</sup> These boundaries include climate change but also other environmental impacts, including ocean

acidification, chemical pollution, nitrogen and phosphorus loading, freshwater withdrawals, land conversion, biodiversity loss, air pollution and ozone layer depletion.<sup>40</sup> For the purposes of this Report, these consumers are referred to as “overshoot consumers.”

Overshoot consumers are exceeding local and global ecological targets and need to reduce their consumption and adopt lower carbon practices such as investing in renewable energy to power their homes; walking, biking or riding mass transit to get around the city; and sharing, reusing and repairing goods instead of buying new items. Overshoot consumers include mid- to high-income households, businesses and government entities, especially those that have the greatest spending power during an economic recession.

Conversely, “shortfall” is the lack of consumption, and by extension, the consumers who are consuming too little to meet basic human needs. UN Sustainable Development goals define basic human needs as the absence of poverty or hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable energy, decent work, reduced inequality, and peace and justice.<sup>41</sup> Shortfall consumers are “short” on their consumption and need to consume more of the basic necessities to satisfy their well-being. These consumers need to increase consumption and thereby may produce more carbon emissions than they currently do today. These consumers can benefit greatly from investments in economic development and programs to help increase their resilience, financial opportunity, and ability to spend on all types of goods, food and services.

By nearly every measurement — health, income, housing, public safety and education — Black, Indigenous and other communities of color face the greatest disparities. These are shortfall consumers that need prioritized investments for economic recovery, resilient neighborhoods, financial opportunity and economic security. Using the *Doughnut Economics* framework, the City should center work on improving quality of life and well-being for Black and Indigenous communities because they have the most to benefit from those investments.

Portland’s minimum wage service workers are shortfall consumers because they have experienced heightened vulnerability due to higher costs of living and the effects of COVID-19 that leave many unemployed by the shuttered service industry. These workers are living with economic hardship and are on the edge of housing displacement with a limited social safety net for support, such as access to healthcare.

Other frontline communities also comprise shortfall consumers who face additional harms, such as exposure to increased heat and air pollution from laboring outdoors, low-income housing near freeways and railyards, housing displacement that leads to longer commute times in polluted transportation corridors, and lack of financial resources to invest in home repair, air conditioning, energy efficiency and renewable energy.

The SC&PR methodology utilized the *Doughnut Economics* framework to develop solutions that separately target both overshoot and shortfall consumers ([see Methodology in Report Appendix](#)). Overshoot consumers are targeted through supply-side interventions, such as reducing the carbon intensity of production, or demand-side interventions, such as buying less and participating in the local sharing economy. Shortfall consumers are supported in different ways that are less directly related to reducing carbon emissions, such as increasing economic opportunity through job creation in the reuse and repair of clothes and furniture. Or they might benefit from demand-side interventions like participation in Free Geek programs, which provide digital literacy training and free refurbished computers to nonprofits and members of low-income and underserved communities. While the SC&PR makes recommendations for strategies and actions, these must be vetted and further developed by affected communities through continued stakeholder engagement.

## **FRONTLINE COMMUNITIES**

The City of Portland recognizes that frontline communities in Portland and worldwide, including Black and Indigenous people, communities of color, immigrants, refugees, low-income individuals, labor and workers, people living with disabilities, youth and individuals experiencing houselessness, are often the communities least responsible for contributing to climate change, yet are disproportionately affected by its impacts.

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## ***Doughnut Economics’* proposed role of government**

Raworth outlines a clear vision for the role of government in *Doughnut Economics* with the concept of the “embedded economy.” She argues that the traditional economic model of a self-contained market, a closed-loop system, is insufficient because it ignores the Earth’s planetary boundaries, supply of raw materials, energy and living matter, and social and environmental impacts that can result in waste, pollution, and harm to society.

Raworth makes the case that the economy is not a closed loop but is embedded within both the Earth's planetary boundary *and* society, taking in energy and wasting materials and heat (see Figure 8). In this model, Raworth highlights that important actors within the economy are not limited to households and business, but also include the state and public commons. The commons are the cultural and natural resources accessible to all members of the community, including natural materials such as air, water, parks, public lands. Commons can also be understood as free spaces where communities come together to engage, share ideas and information — whether virtually like Wikipedia or physically like a library or community center.

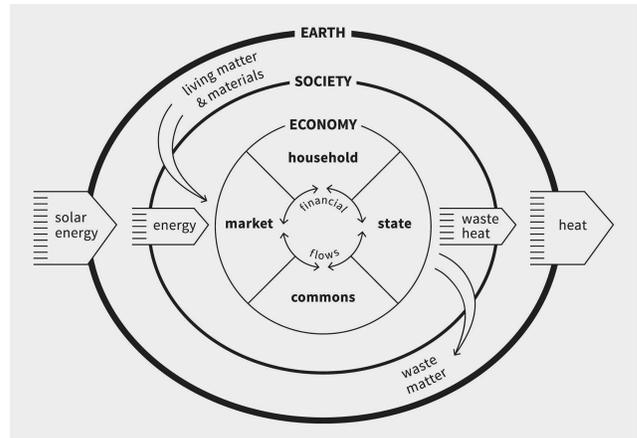


Figure 8: An illustration of the embedded economy. Source: Doughnut Economics: Seven Ways to Think Like a 21st Century Economist (2017).

*Doughnut Economics* makes the case that the market is powerful, so it must be embedded wisely: “There is a flip side to the market’s power; it only values what is priced and only delivers to those who can pay. Like fire, it is extremely efficient at what it does, but dangerous if it gets out of control.” This speaks to the role of government, which is “essential,” according to Raworth. “The state should aim to be starring as the economic partner that supports the household, the commons and the market alike.”

Raworth notes that government’s role should first be to provide public goods that deliver for all, not just for those who can pay. Secondly, government should support households and families with policies such as parental leave, early education, and social safety protections. Third, government should enable collaborative potential of the commons and to protect it from private sector encroachment. Fourth, it should regulate the private market through the promotion of the common good — from banning toxic pollution and insider trading to protecting biodiversity and worker rights.

## The call for a regenerative economy

Manufacturing is generally focused on degenerative design — extracting resources from the Earth to produce products that consumers use and then throw away — producing carbon emissions and environmental pollution throughout the lifecycle of those products. Raworth argues that this one-way cycle of production to waste is counter to the living world and quickly depleting the limited resources available on the planet. Conventional economics assumes that increased economic growth will provide the resources for households and businesses to clean up waste and pollution generated by this one-way cycle. **Raworth argues that growth has yet to show it can accomplish these things. In fact,**

**environmental goals have been achieved only when governments have intervened to regulate waste and pollution to achieve cleaner air and water.**

Instead, Raworth proposes that economies move from degenerative by default to regenerative by design. This requires government to begin using financial resources and regulatory authority to shift the economy to one that uses renewable energy and materials, an economy that incentivizes the use of waste from one process as inputs to new processes. These models are often referred to as “circular economy models,” but they are exceedingly difficult for businesses and industry to achieve on their own, particularly in equitable ways and without government intervention and planning. Businesses lack the incentives to invest in circular economy — both regulatory and free market — for extended producer responsibility and material reuse. Through innovation, governments can work to harness the potential of the market, the commons and households to build a regenerative economy.

Portland could play a stronger role in regulating carbon and other pollution from businesses, vehicles and households while funding innovation in renewable energy and circular economy models. In fact, many environmental groups are calling for the City to do so. With Portland as the largest city in Oregon and with carbon emissions, air quality, traffic congestion and overshoot consumption being largely urban problems, it may be unreasonable to expect a largely rural state to adequately address these issues. By using Portland’s regulatory authority, investing dollars in circular economy models, building local supply chains, and directly targeting carbon emission reductions and other environmental pollution, Portland can play a key role in fostering and incentivizing regenerative design.

To achieve a regenerative economy by design, Portland needs to intentionally invest in planning for a circular economy. [The Ellen MacArthur Foundation](#) has a policy guide to help cities enable a transition to a circular economy. [The City of Amsterdam in the Netherlands](#) has adapted a 2020–2025 Circular Strategy, and the [City of Charlotte in North Carolina](#) has adopted “Circular Charlotte,” a new regenerative economic model designed to produce zero waste. These and other examples point the way for Portland to begin this work. However, it is critical that as Portland embarks on this work, it is done with a strong equity and anti-racist lens — which may be one of the greatest innovations Portland can offer the field of study.

The SC&PR is the beginning of a conversation to restructure Portland’s systems and the larger economic forces that drive unsustainable production and degenerative design. This SC&PR is intended to lay a foundation to further expand this work in the coming years.

# BPS strategies and proposed actions to reduce consumption-based emissions

July 1, 2021, to June 30, 2023

The following section outlines Portland’s strategies and proposed actions to reduce consumption-based emissions. Throughout 2019, workgroup participants identified a broad set of strategies to reduce emissions in five categories of consumption with the greatest upstream impacts. The proposed actions (131 in total) were chosen based on the City’s role and ability to influence these activities. The strategies and actions were intended to, over a 3-year period, increase consumption-based emissions literacy and normalize work on sustainable consumption at the City of Portland. This would serve as an on-ramp to more transformational action in the coming years.

However, with COVID-19, an economic recession and calls for racial justice and police reform, it has become clear that BPS has a responsibility to think bolder and act bigger in shifting work to address these intractable systemic challenges, and hence, the goal was adjusted. BPS needs to quickly build staff internal capacity (through training, education and shifting workplans) and ready the bureau and the City to quickly seize bigger opportunities and support community priorities and leadership.

From each category, strategies and actions were selected that are within BPS’ span of control, are feasible in economically constrained times and will help the local community — in particular Black, Indigenous and other communities of color — to achieve economic recovery and build resilience. These actions were vetted with implementation teams and in some cases modified to reflect new insights and approaches.

The resulting actions are presented under the BPS programs and policies section below. Through this process, we expect that some actions will not prove viable or be out of alignment with community goals and priorities, especially for shortfall consumers. This Report acknowledges that this is the first attempt by BPS to advance a comprehensive framework to reduce consumption-based emissions, and the work will expand and evolve in response to community feedback and the rapidly changing landscape.

The work was also initiated to build the following:

- *Measures of success.* Being on the leading edge of consumption-based emissions work, BPS staff will collaborate to develop new ways to measure progress. This includes citywide metrics for economic progress that prioritize well-being and quality of life, strategy-level indicators, and action-level goals.
- *A communications strategy.* Building a cohesive narrative for this body of work will be critical to the bureau’s ability to secure community and political support and obtain additional resources.

Investing in a thoughtful communications strategy will make the concept of sustainable consumption tangible and serve as a valuable platform to reflect insights gained from community leadership.

- *Staff leadership.* The SC&PR lays the foundation for transformational action. As the bureau steps into this new space, it is important to resource intentional ways to quickly advance and evolve this body of work. The SC&PR calls for a Core Team to leverage early insights and identify bigger, transformational actions that will follow as this work expands in the coming years.

## Sustainable Consumption and Production Vision

- Advance systemic changes to reduce unsustainable levels of consumption.
- Achieve prosperity, resilience and health and well-being for all Portlanders, especially shortfall communities.
- Develop resilient and sustainable supply chains.
- Increase local, low-carbon and regenerative production.

## Sustainable Consumption and Production Goals

- Reduce global carbon emissions produced as a result of local consumer demand.
- Reduce environmental impacts across the entire lifecycle of materials.
- Create benefits for communities and individuals who are currently unable to meet their basic needs, by centering on racial justice.
- Grow, retain and expand Black, Indigenous and people of color-owned businesses that are part of the low-carbon economy and engaged in healthy workplace practices.

## Outcomes

BPS' 2-year actions will achieve the following outcomes:

- Portland is established as a national and international voice for sustainable consumption, as demonstrated by its presence in the media and events and in outreach from other cities that seek to replicate this work.
- Leaders in Black, Indigenous and other communities of color who are advancing sustainable consumption and production strategies are visible in this work, and community actions have been resourced with staff time and money.
- Partnership commitments with other bureaus and community organizations to implement actions have been secured.
- Clear roles for BPS staff and leadership and shifts in the organizational structure, programs, staffing and budget have been made to adequately resource this work.
- A set of local policies, campaigns, programs and marketplace interventions are implementation-ready when resources and political support are secured.

## BPS strategies and actions by category

The following section presents BPS’ strategies and actions for FY 2021–22 and proposes actions for FY 2022–23 to be considered given budget, staffing and community priorities, as well as insights and lessons learned in the first year. Work will advance on the strategies discussed below at different paces; not every strategy has work plan actions proposed for Year One.

### Food

The food category, including beverages, represents the single largest source of production-phase emissions, with 85% of emissions from food and beverages coming from the production of food and not the transportation, retail and disposal of food scraps. As such, the most powerful interventions address: 1) preventing food waste, which also reduces upstream emissions from food production, and 2) promoting food choice, shifting food choices toward lower carbon options — specifically, plant-rich diets. In fact, Project Drawdown, Paul Hawken’s preeminent listing of a hundred climate solutions, ranks reduced food waste and plant-rich diets as top global solutions to reduce carbon emissions (3rd and 4th, respectively).

From Portland’s CBEI, most emissions from food production occur within the United States, which means that Federal interventions in agricultural production, such as the Clean Power Plan, which would have decreased the carbon intensity of water pumping, can have significant local benefits on reducing consumption-based emissions from food. As most food products are imported to Portland, the biggest local levers for reducing these emissions come from changes in consumer demand.

#### **Strategy 1: Reduce consumption of carbon-intensive foods, particularly red meat and dairy**

For Portland, 28% of all production-phase emissions from food come from beef and pork and 18% come from dairy (mostly from milk, rather than cheese or other dairy products). So, nearly half of all production-phase emissions from food in Portland come from two types of food, indicating the need for this first strategy: reduce consumption of red meat and dairy. On a per-calorie basis, beer, wine and coffee are also carbon intensive, but beverages account for only 4% of production-phase emissions from food and therefore are not prioritized in this workplan.

Year 1	1A. Conduct a food systems landscape scan to understand work underway locally that supports the SC&PR. Identify and recommend actions BPS is uniquely positioned to take that advance SC&PR strategies. Examples BPS roles include convening and coordinating the work of external stakeholders,
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	capacity building or grant writing support, identifying, or reinforcing policy priorities, supporting expansion of SNAP benefits, providing asset management and business development support.
Year 1 and Year 2	1B. Research and test behavior change initiatives that reduce red meat and dairy consumption.
Year 2	1C. Explore procurement policy to limit purchases of red meat and dairy, with culturally appropriate exemptions. Ensure Black, Indigenous and people of color owned catering companies have offerings that meet this requirement. If not, make needed changes to the policy and/or support business menu changes to ensure BIPOC owned businesses benefit. Use this as a model to support adoption of similar policies among local and regional governments and large institutions.

**Strategy 2: Prevent the wasting of food**

Preventing the wasting of food reduces the need for more upstream food production, in addition to reducing methane emissions from landfilled food waste. It also stretches food dollars. Oregon households — regardless of income level — throw away more than 6 pounds of food per week, 71% of which could have been eaten. The actions identified for this workplan focus on both commercial food waste, which is the largest source of food waste locally, and household food waste prevention, which lowers food costs.

Year 1 and Year 2	2A. Launch Pacific Coast Collaborative partnership working with west coast producers and retailers to halve food waste by 2030. Facilitate business-led problem solving focused on dairy and produce waste prevention and work with retailers to measure progress.
	2B. Together with regional partners increase the reach of the Eat Smart Waste Less program, with a focus on food insecure households. Example actions include piloting cohort challenges and partnering with food security groups and local chefs to get waste prevention tips in food boxes.

**Strategy 3: Collaborate with BIPOC and low-income communities to increase food access, food security and ownership of farming and production.**

Increasing food access acknowledges that many shortfall consumers lack access to healthy and low-carbon foods. It also addresses the impact of processed foods, which can, depending on the process, degrade the nutritional content of food. Highly processed foods are also often more carbon-intensive due to the energy inputs of food processing. With that said, certain types of food processing are critical to preserving foods and preventing wasted food.

This strategy is also focused on expanding local agriculture, an important avenue to support self-sufficiency, health and economic opportunity for shortfall consumers. There are several community-based agricultural organizations supporting communities of color and low-income populations:

- Zenger Farm connects low-income community members living with diet-related chronic illnesses with a season’s worth of fresh vegetables to include as part of their health care regimen.
- Grow Portland has developed 11 community gardens serving primarily immigrants and refugees.
- Mudbone Grown is a local Black-owned farm enterprise that promotes inter-generational community-based farming that creates measurable and sustainable environmental, social, cultural and economic impacts in communities.

The City’s work to support shortfall consumers in creating access to agricultural opportunities and healthy, low-carbon foods is bolstered and prioritized by existing community leadership.

Year 1	3A. Support local farmers of color through direct financial and technical assistance and through approach to managing community gardens. See Zenger Farms, MudBone Grown examples.
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## Goods and Services

Goods are the broadest category of products, including most items purchased at department stores, hardware stores, office supply stores, or non-food items purchased at grocery stores. For the purposes of the SC&PR, goods data analyzed included manufactured goods, clothing, furnishings and supplies and retail distribution, accounting for about 15% of total consumption-based emissions.

The top sources of production-phase emissions from goods are mostly from the extraction, processing and carbon-intensive manufacturing of raw materials used to produce finished products. The detailed tables in the [Report Appendix](#) break out the emission sources within the goods category.

While electronics contribute only 4% of Portland’s overall consumption-based emissions, this category is a focus of the work within goods because it presents important opportunities to address sustainability and consumption. Electronics that can be reused, upgraded, repaired and recycled help to reduce lifecycle carbon emissions. Electronics have significant lifecycle impacts beyond carbon emissions, in terms of toxicity and unfair labor and dangerous conditions that workers endure to mine raw materials and manufacture components and finished products. Given the overall growth in electronics production and future potential, this category is elevated in importance. COVID-19 also has increased the urgency of efforts to support digital equity and internet access for shortfall consumers.

In contrast to goods, service provision is the consumer purchase of a service, rather than a product (good) or food. Services are the second largest contributor to consumption-based emissions, accounting for 20% of total emissions. This category accounts for businesses that are service providers, including healthcare providers, realtors and engineers. The top categories contributing to production-phase lifecycle emissions in this sector include healthcare and pharmaceuticals (32%); legal, real estate, finance and insurance (15%); education (8%); telecommunications (5%); scientific research and development (5%); and hotels (3%).

Some of these industries are heavily regulated, like healthcare, pharmaceuticals and telecommunications. As a result, there may be limited interventions to reduce lifecycle emissions depending on requirements to use single-use disposable products for sanitation or the need for high-tech imaging and telecommunications equipment. Organizations like Practice Greenhealth and Healthcare Without Harm have already developed best practices for the healthcare industry, which can be leveraged along with similar efforts in other sectors.<sup>42</sup> Service industry supply chain analyses can help inform the best strategies to reduce lifecycle emissions. These interventions will be considered in future years.

**Strategy 4: Increase participation in reuse, repair and share services.**

The goods workgroup identified key barriers to reducing these emissions, including the low cost and abundance of disposable products, accessibility of online and convenient shopping and the lack of scale for alternatives such as repair and sharing. This strategy focuses on expanding opportunities to rent, share, fix and reuse goods to reduce the need for new purchases and provide more affordable options to the community. In addition, this strategy is about supporting small and Black and Indigenous businesses to expand and thrive in a low-carbon future.

Year 1	4A. Identify strategies to scale up community-led reuse, repair and share initiatives by conducting a needs assessment. Develop and initiate an implementation strategy. Strategy activities could include piloting innovative
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	lending library models, scaling existing programs to train the next generation of fixers, and public/private partnerships to secure space for staging and sorting donated items for reuse.
	4B. Conduct a landscape scan and needs assessment of repair/reuse/share businesses. Identify and recommend strategies to support business retention and growth, with a focus on BIPOC-owned businesses. Examples include models to sell used products alongside new ones, or co-located in traditional malls, low-barrier-to-entry models such as vendor stalls in the public right of way, supporting industry advocacy in regional recovery strategies, market research and policy changes.
	4C. Collaborate with Office of Community Technology (OCT) to expand, promote and recognize the existing pipeline of reused electronics from large organizations like COP to schools and then to low-income families.
Year 1 and 2	4D. Advocate for Oregon Right to Repair Legislation.
Year 2	4E. Implement private-sector and community-led strategies that scale up opportunities to reuse, repair and share.
	4F. Support OCT in working with schools to develop electronics lifecycle agreements. With tens of thousands new and refurbished devices being purchased to support distance learning, coordinate lifecycle agreements across entities to ensure improved reusability for devices.

**Strategy 5: Increase adoption of low-carbon business practices for both government and private sector.**

This strategy begins the transition to clean energy and a circular economy. For the first year, this strategy is focused on renewable energy for industry and commercial businesses, by building off Portland’s successful work to expand solar adoption in the residential sector. Large commercial and industrial rooftops are natural candidates for solar installation, and the decision to install them are best made during construction or major renovations. The strategy also includes the shift to industrial use of renewable energy and renewable process fuels, to reduce the carbon intensity of local production activities. Eventually, this strategy can expand to support and encourage other regenerative production practices and building more resilient, local, and low-carbon supply chains.

Government is also a consumer and contributor to global climate change. The government directly generates demand for material consumption through infrastructure and facility development and through the purchase of vehicles, computers and other goods for its operation. Portland’s CBEI shows that all government entities (e.g., the City of Portland, Multnomah County and Portland Public Schools public schools) combined are responsible for 12% of Portland’s consumption-based emissions.

The City commissioned Trucost, a world leader in natural capital valuation, to assist in calculating the environmental impacts of its supply chain by conducting a sustainable supply chain analysis for purchases made by the City in FY 2014-15.<sup>43</sup> The spend analysis identified the highest contributing categories: concrete, asphalt, electricity/natural gas, carpet, professional services, building maintenance and tenant improvement, auto/vehicle parts and supplies and onsite fuel use. The government focused actions below focus on reducing lifecycle emissions from City of Portland operations from those primary sources and are prioritized by BPS’ strategic role and will be expanded in collaboration with other bureaus in the coming years.

Year 1	5A. Research opportunities to extend product life for City of Portland purchased furniture, fixtures and equipment (FFE) by supporting reuse, repair and standardization.
	5B. Create a shadow cost of carbon for City of Portland to inform purchasing decisions and infrastructure investments. A shadow cost of carbon is a decision-making tool to help purchase the least carbon intensive products and materials, like low-carbon concrete or more energy efficient electronics. A shadow cost of carbon needs to be calculated on a lifecycle basis to fully account for the embodied carbon in goods and materials procured by the City.
	5C. Scope requirements for industrial and large commercial facilities to have onsite renewable power at time of major remodel or new construction by 2030.
	5D. Update City of Portland replacement strategy for fleet vehicles that includes a cost for carbon and consider standards for new equipment to move towards the City’s net-zero carbon goals.
Year 2	5E. Explore opportunity for new clean energy program to specifically target industrial facilities to shift to renewable energy and renewable process fuels.

	<p>This may include technical assistance, education, recognition, case studies, financial incentives or other government provided benefits.</p>
	<p>5F. Support CityFleet in conducting a utilization study that includes recommendations to change vehicle types and reduce the number of fleet vehicles, where appropriate; reduce Vehicle Miles Travelled by City fleet; improve fuel economy; add additional idling education and find other ways to reduce fuel use.</p>
Year 1 and 2	<p>5G. Advocate for State pricing of carbon that accounts for lifecycle carbon impacts of materials and products.</p>
	<p>5H. Update the City of Portland’s Green Building Policy to prohibit new gas infrastructure for new building projects and requiring existing buildings to retrofit heating from gas to electric as equipment ages and is replaced.</p>

**Strategy 6: Reduce the sale and use of high-impact products**

Demand-side interventions present significant opportunities to reduce emissions and toxics locally through policy change and at a state level through advocacy.

Year 1 and 2	<p>6A. Scope for future consideration new taxes on producers and retailers of high carbon consumer or luxury goods.</p>
	<p>6B. Support statewide legislation that requires all products containing chemicals of concern to be labeled or removed from the consumer marketplace. (Like CA Proposition 65)</p>
	<p>6C. Support strengthening, or updating Toxic Free Kids Act, including adding new electronics chemicals and toxics reduction policies at the statewide level.</p>
As opportunities arise	<p>6D. Advocate with Oregon Environmental Council and other partners for regulatory reporting procedures for the Oregon Toxics Free Kids Act. Consider additional reporting requirements at the local level.</p>

**Strategy 7: Reduce community exposure to toxics, prioritizing outcomes for BIPOC community**

This strategy goes beyond reducing carbon emissions from businesses and prioritizes actions that support smaller service providers in reducing worker exposure to air pollution and toxics from sources such as chemical cleaning products and two-stroke gas engines. CBEI data showed that chemical and other fertilizer manufacturing was the most carbon-intensive manufacturing sector within the goods category.

Year 1	7A. Identify service sector industries with high worker exposure to toxins where BIPOC ownership and staffing is also high, such as landscaping, salons, day care, assisted living and cleaning. Identify support needed for companies to adopt healthy workplace practices. Prioritize actions that foster BIPOC-owned business leadership and growth.
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**Strategy 8: Increase digital inclusion and expand internet access**

Year 1	8A. Together with OCT, work with local service providers to improve speeds and affordability of internet access to underserved households (e.g. providers give discount codes or a fixed cost for a number of months) as part of Digital Divide Rapid Response program and seek opportunities to continue the program.
Year 2	8B. Support OCT to obtain funding for broadband subsidies for low-income residents who qualify for electric/gas/water utility assistance or other public assistance programs.  8C. Increase capacity at community organizations to offer culturally appropriate computer trainings for Black, Indigenous and communities of color, low income, and/or disability communities (ex: Free Geek's Earn a Computer class). Classes should remove barriers to participation, for example, by being offered off-site or online.

**Strategy 9: Improve end-of-life requirements for high impact goods**

Year 1 and 2	9A. Support new statewide legislation for product stewardship and take-back policies (DEQ, household hazardous waste, carpet, medical sharps, mattresses, tires, batteries, solar panels- etc.)
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Year 2	9B. Work with BTS and Procurement to 1) Create a plan for managing the City's data storage that is consistent with the City's 100% renewable target, and 2) Extend the City's electronics procurement policy that requires designated end-of-life plans to all electronics purchases. Policy should prioritize reuse over recycling. Over time, look to this as a model to support adoption of similar policies among local and regional governments and large institutions.
As opportunities arise	9C. Support and advocate for adding wine bottles and liquor bottles to Oregon Bottle Bill and other bottle bill expansions.
	9D. Advocate for Oregon DEQ to expand Oregon E-cycles Program to include other items (ex. peripherals, video game consoles, cameras, scanners, and speakers)
	9E. Advocate for State or Metro to expand landfill ban to other electronics – items like video game consoles, cellphones, and printers.

## Construction and land use

Construction and land use planning are key mechanisms local governments can use to influence consumption patterns. The impacts of construction have global implications, as 21% of global carbon emissions result from the production of just three building materials: concrete, steel and aluminum.

Today, global building square footage is about 223 billion m<sup>2</sup>. By 2060, current worldwide building stock is expected to more than double, with about 40% of that growth occurring in the next 15 years. Most of that growth and development will occur in Asia, India, South America and Africa. Through collaboration with organizations like C40, the Carbon Neutral Cities Alliance, Architecture 2030, the International Living Future Institute and the Carbon Leadership Forum, Portland has an opportunity to be a leader with low embodied carbon building policies and to export ideas to the rest of the world.

Locally, emissions from construction account for 9% of total consumption-based emissions. Of those emissions, cement manufacturing is the single largest contributor, accounting for 15% of consumption-based emissions from construction. Cities can influence construction and development practices, which is why this is a main area of BPS' efforts to reduce consumption-based emissions, with global implications.

**Strategy 10: Increase use of low-embodied carbon materials in new construction**

The City of Portland has already adopted a procurement policy to support low-carbon concrete for City-owned construction projects. The low-carbon concrete standard requires concrete suppliers to disclose the carbon intensity of concrete to the City. In 2021, the City will set a carbon intensity standard, and all concrete used in the City infrastructure projects will need to be below this standard. The SC&PR outlines a similar phased approach to regulate embodied carbon in all new construction, by requiring a lifecycle carbon assessment and disclosure and then eventually implementing a standard to reduce lifecycle carbon emissions over time. This can be integrated into operational emissions standards for simplicity of implementation and compliance.

Year 1 and 2	<p>10A. Begin developing regulations for embodied carbon in new construction through three phases.</p> <ul style="list-style-type: none"> <li>• Phase 1: Measure and disclose the whole building lifecycle assessment, using standard reporting templates at the time of permitting.</li> <li>• Phase 2: Establish a “carbon intensity per square foot” target. Use the target rather than a prescriptive approach to promote market innovation in low-carbon buildings.</li> <li>• Phase 3: Require new construction to meet the target, phased in by 2030.</li> </ul>
Year 2	<p>10B. Update the City of Portland Green Building Policy to address embodied carbon. Broaden the policy to include preventative maintenance expectations and certain standardized materials and parts. Work with Portland Housing Bureau and Prosper Portland Prosper Portland on updates to their Green Building Policies to encourage this for affordable housing and commercial tenant improvements that receive government funding.</p>

**Strategy 11: Preserve existing buildings and promote adaptive reuse and low embodied carbon tenant improvements**

Preserving embodied carbon in existing buildings is an important strategy to reduce the need for new construction and prevent the upstream emissions associated with building material production. By initially focusing this strategy on home maintenance and repair and salvaged materials, this action is an ideal intervention during an economic recession. Stimulating the repair service industry can boost small local businesses and create living wage jobs for those who are currently unemployed. Targeted

spending on low-income housing repair can also help to improve the quality of life and comfort for low-income homeowners, seniors and people with disabilities.

Year 1	11A. Together with community, scope a house maintenance and repair initiative that utilizes education, outreach, training, small grants and/or incentives to support livability and anti-displacement for low-income homeowners, with a focusing on BIPOC community. Example repairs include roofing, gutters and flashing.
	11B. Scope removing subsidies like System Development Charge credits that promote demolition.
Year 2	11C. Launch house maintenance and repair initiative if it proves viable and aligns with community priorities.

**Strategy 12: Increase density and availability of smaller housing units**

BPS’ work on land use planning, which as discussed in previous sections, plays a key role in establishing conditions for urban consumption. This strategy builds off the 2035 Comprehensive Plan and Residential Infill Project to achieve more density and smaller housing units through zoning code amendments and incentives.

Year 1	12A. Begin community conversations to learn how to educate low income homeowners on potential to impact property values and use those conversation to learn about what kind of support is needed for these households to take advantage of RIP
	12B. Expand opportunities for group living by reducing code barriers as part of the Shelter to Housing Continuum
	12C. Through Historic Resources Project, explore limits on demolitions unless projects result in more housing units per property.
Year 2	12D. Investigate and implement programs to facilitate the ability of low-income homeowners to add new rental units to their property, including

	possible loan programs, financing, education, etc. (see Verde's ADU program).
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### Strategy 13: Prevent the wasting of building materials

A focus on preventing the waste of construction materials, through incentives, education and investments in transfer systems for reused and surplus building materials preserves the embodied carbon in those materials and helps to reduce landfilled waste. Waste prevention and the use of reused and salvaged local building materials also reduces the upstream emissions from material transport and production of new building materials.

Year 1	13A. Scope ways to support development of new products that are fabricated from salvaged and surplus building material (e.g., mass timber, trusses, cladding, consumer goods).
	13B. Explore incentives and requirements for use of a minimum amount of salvage material in new projects, especially forward-facing exterior applications.
Year 1 and 2	13C. Advocate for and support Extended Producer Responsibility laws at the State and/or Federal level for building materials, to increase recovery (i.e., drywall, ceiling tiles, carpet)Advocate and support Extended Producer Responsibility laws at the state and/or Federal level for building materials to increase recovery (i.e., drywall, ceiling tiles, carpet)

### Economic Progress

As much of this strategy has discussed – without market interventions that limit harmful impacts, the economy will continue to drive towards unsustainable levels of consumption and production. One of the key challenges for this new work will be shifting how progress is defined and measured from economic growth to better indicators that are aligned with *Doughnut Economics*, acknowledging the planetary boundaries and importance of quality of life and well-being.

**Strategy 14: Shift how economic progress is defined to better reflect community resilience, well-being, and environmental limitations**

Year 1	14A. Assess the scope, format, and membership for a new Sustainable Economics workgroup to inform the development of recommendations on shifting the economy, including focus on community health and well-being, sustainable levels of consumption, local supply chains, regenerative design and circular economy.
Year 2	14B. Convene Sustainable Economics workgroup to develop recommendations by the end of year two.

**SC&PR workplan measures of success**

As a CBEI begins to fill the gap left by traditional sector-based carbon accounting, the complexity and modeling required for CBEI makes ongoing measurement challenging. CBEIs are modeled estimates with many assumptions about global emission intensities for production and little granularity into how those global factors change over time.

A CBEI is important to get a sense of scale and direction for how to address emission sources and understand trends over time — such as the increases in construction and service sector emissions between 2011 and 2015. However, the effectiveness of reducing consumption-based emissions may be tough to measure with CBEI alone. This because it is difficult to tease apart increases in consumer spending and population growth. Portland will need to find additional ways to measure the ability to thrive while staying within the ecological boundaries. In addition, a reduced CBEI may be challenging with increasing dependence on imports and global supply chains, so tracking these changes will be critical.

The *Doughnut Economics* framework requires measurements of success to be much more multi-variable, tracking against numerous social, economic and environmental indicators. This reflects the complexity of the world and requires BPS to measure success with a multivariate approach, including new ways to measure economic progress beyond GDP.

Given the urgency of the climate crisis and limitations of CBEI data, the SC&PR recommends that BPS begin implementation with the understanding that the City’s ability to better measure reductions in consumption-based emissions will continue to improve over time. Numerous cities and nonprofits like C40, International Council for Local Environmental Initiatives and the Carbon Neutral Cities Alliance are currently working on the measurement problems associated with consumption. The following is BPS’ near-term approach to measuring success of the SC&PR.

In the first 2 years of implementing BPS' SC&PR, a measurement plan will be developed, including measures of success, a strategy for data collection, a timeline and list of resource needs. This should include both broad population-level metrics (for emissions, well-being and quality of life) and program-level performance measures.

## **Complete CBEI every few years**

This SC&PR includes two CBEI inventories for Portland in the [Report Appendix](#) for the calendar years 2011 and 2015. Portland will continue to complete a CBEI in partnership with and following the approach and schedule of the DEQ. Portland will continue to work in sequence with the State of Oregon and for alignment with other jurisdictions in Oregon. This approach better enables collaboration and maximizes local resources.

## **Develop strategy-level indicators**

Over the coming months, BPS will consider indicators for each of the strategies. Indicators should be aligned with the strategies, which are long term and directional. These indicators should signal that the work from the SC&PR is moving in the right direction.

## **Develop action-level performance metrics**

Through action implementation and during community engagement and research, BPS staff should consider action-level performance metrics that would indicate success. An action-level performance metric might be a performance or outcome-based goal, such as reaching 10,000 households with a marketing campaign focused on tenants and residents of color. Or the action may be more simply to build relationships with five new immigrant-owned businesses. Each metric should be developed as the action is being implemented, specific to the action, and reflective of racial equity, the *Doughnut Economics* framework and lifecycle carbon accounting.

## **Utilize new metrics for economic progress that prioritize well-being and quality of life over GDP and economic growth**

To shift thinking from GDP and economic growth, BPS needs new measurement tools that provide a more balanced level of growth, equitably distributed benefits and improved well-being and quality of life. A few emergent measurement tools may be considered, such as the Genuine Progress Indicator (GPI) or Index of Sustainable Economic Welfare).<sup>44</sup> These metrics are designed to take fuller account of the well-being, only a part of which regard the health of the economy by incorporating environmental and social factors, which are not measured by GDP. For instance, GPI may decrease in value when the poverty rate increases.

## Develop shortfall consumer metrics based on racial demographics and geography

The SC&PR outlines a new framework for sustainable consumption that includes the importance of closing the “*doughnut*” for shortfall communities. This requires new measurements of success that consider well-being, health, and community resilience, with a racial equity lens that addresses disparities by race and geography. Portland’s next Climate Planning efforts will wrestle with these same questions and both projects can share resources for measurement.

## SC&PR communications plan

The SC&PR is a critical first step to establishing the language, concepts and internal communication needed to address the complex challenge of reducing consumption-based emissions. To support this, BPS will develop and launch a communications strategy.

With a change-driven approach to implementation, the workplan itself will expand and evolve based on engagement with community, along with research and experience with early implementation. The bureau’s understanding of the work will evolve, too. As such, it is expected that messaging and communications strategies will also need to be adaptive.

BPS communication strategy will aim to:

- Reflect Black, Indigenous, and communities of color needs and experience in the sustainable consumption narrative.
- Establish Portland as a national and international voice for sustainable consumption, as demonstrated by its presence in media and events and in outreach from other cities that seek to replicate this work.
- Increase consumption-based emissions literacy among BPS staff and leadership, City bureaus and the community.
- Inform action by capitalizing on Portlanders’ desire to make better choices for climate and community.

Additional communications strategies will be developed to support the implementation of forthcoming policies, community-led initiatives, BPS programs, behavior change campaigns and other supply-side and demand-side marketplace interventions that will emerge from the SC&PR.

## BPS leadership for the SC&PR

The SC&PR utilizes a change-driven approach that allows BPS staff to begin implementation while learning, adapting and planning for progressively bigger moves. BPS’ work will be informed by a

minimal set of objectives and rapidly delivered in short iterations, guided by staff advisers with expertise in disciplines ranging from planning to food systems, economic development and community engagement. This is counter to the typical plan-driven approach where all objectives are stated upfront, deliverables are largely fixed, and project stages are linear. In this typical scenario, implementation actions are either not started, in progress or completed.

Staff will use three guideposts to assess changes and additions to the actions: 1) the City's role and ability to influence the work, 2) alignment with the Report's stated vision and goals, and 3) likelihood of delivering on the SC&PR data-informed strategies. Additional foundational tools may be developed as necessary to guide progress.

## **Implications for local solid waste management**

The work to address climate change, sustainable consumption and end-of-life materials management is overlapping. Sustainable consumption is part of a larger emphasis on reducing lifecycle emissions and other environmental impacts, which has implications for traditional solid waste management. Greater benefits for all three priorities can be achieved by working further upstream, rather than only at the end-of-life, disposal phase. Shifting existing Solid Waste Management Fund resources from end-of-life focused work toward upstream interventions will help resource priority work on sustainable consumption and production. This shift will better positioning Portland for success in tackling larger systemic issues of sustainable consumption while ensuring that frontline communities experience improved community health and well-being.

The SC&PR sets a course of action for Portland, while also positioning BPS to pursue additional revenue sources. The State of Oregon, as well as neighboring Washington and California, are currently exploring extended producer responsibility (EPR) programs for collection and/or processing of recyclable packaging. EPR as a source of revenue puts the cost burden on the parties most responsible for profiting from consumption. Other possible revenue sources will be explored and evaluated as part of the SC&PR; examples include potential new fees or taxes on luxury goods or consumption. Together, these will provide resilient and consistent resources for the SC&PR over time.

# Contact

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## About City of Portland Bureau of Planning and Sustainability

The Bureau of Planning and Sustainability (BPS) develops creative and practical solutions to enhance Portland's livability, preserve distinctive places, and plan for a resilient future.



THE BUREAU OF **PLANNING  
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- <sup>1</sup> Flavelle, C. (2019) *Climate Change Threatens the World's Food Supply, United Nations Warns*. The New York Times. Retrieved June 17, 2021, from <https://www.nytimes.com/2019/08/08/climate/climate-change-food-supply.html>.
- <sup>2</sup> IPCC. Handmer, J., Y. Honda, Z.W. Kundzewicz, N. Arnell, G. Benito, J. Hatfield, I.F. Mohamed, P. Peduzzi, S. Wu, B. Sherstyukov, K. Takahashi, and Z. Yan, (2012) *Changes in impacts of climate extremes: human systems and ecosystems*. In: *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 231-290. Retrieved June 17, 2021 from [https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap4\\_FINAL-1.pdf](https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap4_FINAL-1.pdf).
- <sup>3</sup> Cusick, D. (2009) *Premature Deaths Multiply as Climate Changes*. Scientific American. Retrieved June 17, 2021 from <https://www.scientificamerican.com/article/premature-deaths-multiply-as-climate-changes/>.
- <sup>4</sup> Friedlander, B. (2017) *Rising seas could result in 2 billion refugees by 2100*. Cornell University. Retrieved June 17, 2021 from <https://news.cornell.edu/stories/2017/06/rising-seas-could-result-2-billion-refugees-2100>.
- <sup>5</sup> IPCC (2018) *Summary for Policymakers*. In: *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [V. Masson-Delmotte, P. Zhai, H. O. Pörtner, D. Roberts, J. Skea, P. R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J. B. R. Matthews, Y. Chen, X. Zhou, M. I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, T. Waterfield (eds.)]. World Meteorological Organization, Geneva, Switzerland, 32 pp. Retrieved June 17, 2021 from [https://report.ipcc.ch/sr15/pdf/sr15\\_spm\\_final.pdf](https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf).
- <sup>6</sup> Götze, S. (2019). *The downside of electromobility: Lithium mining in South America destroys livelihoods & access to water for indigenous people*. Deutschlandfunk. Retrieved June 17, 2021 from [https://www.deutschlandfunk.de/lithium-abbau-in-suedamerika-kehrseite-der-energie-wende.724.de.html?dram:article\\_id=447604](https://www.deutschlandfunk.de/lithium-abbau-in-suedamerika-kehrseite-der-energie-wende.724.de.html?dram:article_id=447604).
- <sup>7</sup> Amnesty International (2016). *This is what we Die For: Human Rights Abuses in the Democratic Republic of the Congo Power the Global Trade in Cobalt*. Retrieved June 17, 2021 from <https://www.amnesty.org/download/Documents/AFR6231832016ENGLISH.PDF>.
- <sup>8</sup> AFWA, CENTRAL, GLJ, LIPS, SLD. (2018). *Gender-based violence in the Walmart garment supply chain*. Retrieved June 17, 2021 from <https://www.globallaborjustice.org/wp-content/uploads/2018/05/GBV-Walmart-25-May-2018.pdf>.
- <sup>9</sup> “Just Transition” as defined through principles adopted by the Oregon Just Transition Alliance. Retrieved from [About 1 — OJTA \(squarespace.com\)](https://www.oregonjusttransition.com/about-1)
- <sup>10</sup> Oregon Department of Environmental Quality (2012). *Materials Management in Oregon 2050 Vision and Framework for Action*. Retrieved June 17, 2021 from <https://www.oregon.gov/deq/FilterDocs/MManagementOR.pdf>.
- <sup>11</sup> City of Portland Bureau of Planning and Sustainability (2015). *Climate Action Plan*. Retrieved June 17, 2021 from [https://beta.portland.gov/sites/default/files/2019-07/cap-2015\\_june30-2015\\_web\\_0.pdf](https://beta.portland.gov/sites/default/files/2019-07/cap-2015_june30-2015_web_0.pdf).
- <sup>12</sup> City of Portland Bureau of Planning and Sustainability (2020). *2018 carbon emissions and trends*. Retrieved June 17, 2021 from <https://beta.portland.gov/bps/climate-action/2017-carbon-emissions-and-trends>.
- <sup>13</sup> World Bank (2019). *GDP growth (annual %) United States*. World Bank national accounts data, and OECD National Accounts data files. Retrieved June 17, 2021 from <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=US>.
- <sup>14</sup> Metro (2019). *Total Landfilled waste, 1990-2018*. Portland Bureau of Planning and Sustainability.
- <sup>15</sup> Allaway, D. (2014). *The Role of Cities in Advancing Sustainable Consumption*. SCORAI. Video recorded on October 29, 2014. Retrieved June 17, 2021 from <https://www.youtube.com/watch?v=nOUBPaiqVil>.
- <sup>16</sup> Oregon Department of Environmental Quality (2018). *Oregon's Greenhouse Gas Emissions through 2015: An assessment of Oregon's sector-based and consumption-based greenhouse gas emissions*. Retrieved June 17, 2021 from <https://www.oregon.gov/deq/FilterDocs/OregonGHGreport.pdf>, page 37.

- 
- <sup>17</sup> U.S. Bureau of Labor Statistics (2018). Apparel, Boys, 2 to 15 by Housing Tenure & Type of Area: Type of area: rural and Urban. Consumer Expenditure Survey. Retrieved from <https://beta.bls.gov/dataViewer/view/timeseries/CXUBOYSLB0809M>.
- <sup>18</sup> Anderson, M. (2020). *DO PORTLAND'S LOW-DENSITY ZONES NEED A "DEEPER AFFORDABILITY" OPTION?* Sightline Institute. Retrieved June 17, 2021 from [https://www.sightline.org/2020/01/10/do-portlands-low-density-zones-need-a-deeper-affordability-option/?fbclid=IwAR1bi4kpkdOW2M8wT3EczNZ3Np3h5ZKjBNw5\\_LUktUxQueCHO52OsVZtNfQ](https://www.sightline.org/2020/01/10/do-portlands-low-density-zones-need-a-deeper-affordability-option/?fbclid=IwAR1bi4kpkdOW2M8wT3EczNZ3Np3h5ZKjBNw5_LUktUxQueCHO52OsVZtNfQ).
- <sup>19</sup> Rosenzweig, E., Gilovich, T. (2011). *Buyer's Remorse or Missed Opportunity? Differential Regrets for Material and Experiential Purchases*. Journal of Personality and Social Psychology. Retrieved June 17, 2021 from [https://www.researchgate.net/figure/%age-of-respondents-with-different-levels-of-income-who-indicated-that-their-fig1\\_5634549](https://www.researchgate.net/figure/%age-of-respondents-with-different-levels-of-income-who-indicated-that-their-fig1_5634549).
- <sup>20</sup> Rosenzweig, E., Gilovich, T. (2011). *Buyer's Remorse or Missed Opportunity? Differential Regrets for Material and Experiential Purchases*. Journal of Personality and Social Psychology. Retrieved June 17, 2021 from [https://www.researchgate.net/figure/%age-of-respondents-with-different-levels-of-income-who-indicated-that-their-fig1\\_5634549](https://www.researchgate.net/figure/%age-of-respondents-with-different-levels-of-income-who-indicated-that-their-fig1_5634549).
- <sup>21</sup> Pchelin, P., Howell, R. (2014). *The hidden cost of value-seeking: People do not accurately forecast the economic benefits of experiential purchases*. The Journal of Positive Psychology. Retrieved June 17, 2021 from <https://www.tandfonline.com/doi/abs/10.1080/17439760.2014.898316?journalCode=rpos20>.
- <sup>22</sup> Jebb A., Tay, L. Diener, E., Oishi, S. (2018). *Money only buys happiness for a certain amount*. Purdue University. Retrieved June 17, 2021 from [https://www.purdue.edu/newsroom/releases/2018/Q1/money-only-buys-happiness-for-a-certain-amount.html?mod=article\\_inline](https://www.purdue.edu/newsroom/releases/2018/Q1/money-only-buys-happiness-for-a-certain-amount.html?mod=article_inline).
- <sup>23</sup> Jebb A., Tay, L. Diener, E., Oishi, S. (2018). *Money only buys happiness for a certain amount*. Purdue University. Retrieved June 17, 2021 from [https://www.purdue.edu/newsroom/releases/2018/Q1/money-only-buys-happiness-for-a-certain-amount.html?mod=article\\_inline](https://www.purdue.edu/newsroom/releases/2018/Q1/money-only-buys-happiness-for-a-certain-amount.html?mod=article_inline).
- <sup>24</sup> Bureau of Economic Analysis. Table 1.1.1.% Change From Preceding Period in Real Gross Domestic Product. Retrieved from <https://apps.bea.gov/iTable/iTable.cfm?reqid=19&step=2#reqid=19&step=2&isuri=1&1921=survey>.
- <sup>25</sup> DePietro, A. (2020). *Income Inequality in America Continues Its Inexorable Rise*. Forbes. Retrieved June 17, 2021 from <https://www.forbes.com/sites/andrewdepietro/2020/01/07/income-inequality-rise/#616cbb8522a8>.
- <sup>26</sup> Helliwell, J., Layard, R., & Sachs, J. (2019). *World Happiness Report 2019*, New York: Sustainable Development Solutions Network. Retrieved June 17, 2021 from <https://worldhappiness.report/ed/2019/>.
- <sup>27</sup> Trading Economics. List of Countries by Personal Income Tax Rate. Retrieved June 17, 2021 from <https://tradingeconomics.com/country-list/personal-income-tax-rate>.
- <sup>28</sup> Wikipedia. List of Countries with Universal Healthcare. Retrieved June 17, 2021 from [https://en.wikipedia.org/wiki/List\\_of\\_countries\\_with\\_universal\\_health\\_care#Switzerland](https://en.wikipedia.org/wiki/List_of_countries_with_universal_health_care#Switzerland).
- <sup>29</sup> Livingston, G., Thomas, D. (2019) *Among 41 countries, only U.S. lacks paid parental leave*. Pew Research Center. Retrieved June 17, 2021 from <https://www.pewresearch.org/fact-tank/2019/12/16/u-s-lacks-mandated-paid-parental-leave/>.
- <sup>30</sup> Folger, J. (2021). *Best Countries for Pensions and Retirement*. Investopedia. Retrieved June 17, 2021 from <https://www.investopedia.com/articles/personal-finance/042914/top-pension-systems-world.asp>.
- <sup>31</sup> Bureau of Economic Analysis, CAGDP9 Real GDP by county and metropolitan area, Multnomah County 2001-2018 (Thousands of chained 2012 dollars).
- <sup>32</sup> Oregon Center for Public Policy (2019). *Income inequality in Oregon sets yet another record high*. Retrieved June 17, 2021 from <https://www.ocpp.org/2019/03/06/record-income-inequality-oregon-top/#:~:text=Oregon's%20ultra%2Drich%20%E2%80%94%20the%20highest,Oregon%20Center%20for%20Public%20Policy>.
- <sup>33</sup> Hauser, D., Ordóñez, J. (2019) *Oregon's Ultra-Rich Continue to Pull Away*. Oregon Center for Public Policy. Retrieved June 17, 2021 from <https://www.ocpp.org/2019/03/06/oregon-ultra-rich-income-inequality/>.

- 
- <sup>34</sup> Smock, K. (2019). *Poverty in Multnomah County*. Multnomah County Department of County Human Services. Retrieved June 17, 2021 from [https://drive.google.com/file/d/1Bx48\\_RZJejqR9dIZJCby5Kkk--FgWuAW/view](https://drive.google.com/file/d/1Bx48_RZJejqR9dIZJCby5Kkk--FgWuAW/view).
- <sup>35</sup> Monahan, R. (2019). *County Officials Found 369 More Portlanders Officially Living on the Street*. Willamette Week. Retrieved June 17, 2021 from <https://www.wweek.com/news/city/2019/08/01/county-officials-found-369-more-portlanders-officially-living-on-the-street/>.
- <sup>36</sup> Federal Reserve Bank of St. Louis Economic Data (2020). Burdened Households (5-year estimate) in Multnomah County, OR. Retrieved June 17, 2021 from <https://fred.stlouisfed.org/series/DP04ACS041051>.
- <sup>37</sup> City of Portland Housing Bureau (2020). State of Housing in Portland. Retrieved June 17, 2021 from <https://www.portlandoregon.gov/phb/article/707182>.
- <sup>38</sup> Kristof, N., WuDunn S. (2020). *What Happened to Clayton Green*. Willamette Week. Retrieved June 17, 2021 from <https://www.wweek.com/news/2020/02/05/what-happened-to-clayton-green-two-pulitzer-prize-winning-journalists-find-everything-thats-wrong-with-america-in-small-town-oregon/>.
- <sup>39</sup> As defined by the nine planetary boundaries proposed in 2009 by earth-system scientists Johan Rockström from the Stockholm Resilience Centre and Will Steffen from the Australian National University.
- <sup>40</sup> Rockström, Johan; et al. (2009). *Planetary Boundaries: Exploring the Safe Operating Space for Humanity*. Ecology and Society. 14 (2). doi:10.5751/ES-03180-140232.
- <sup>41</sup> United Nations (2015). *The 2030 Agenda for Sustainable Development*. Retrieved June 17, 2021 from <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>.
- <sup>42</sup> <https://practicegreenhealth.org/> and <https://noharm.org/>.
- <sup>44</sup> Center for Sustainable Economy (2021). *Genuine Progress*. Retrieved June 17, 2021 from [https://en.wikipedia.org/wiki/Genuine\\_progress\\_indicator/](https://en.wikipedia.org/wiki/Genuine_progress_indicator/).