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## CHAPTER 3

# PROFILES IN MANUFACTURING 3

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## INTRODUCTION

When imagining the future of a city like Tacoma, where a new green economy values people and the planet at least as much as it does economic growth, some people may have a hard time visualizing how manufacturing fits into the mix. Even the planning profession has too often treated manufacturing and industry as something to be avoided and kept away from people. For many of us, “manufacturing” conjures images of large, dirty factories with billowing smokestacks, reminiscent of the first industrial revolution. There are common misconceptions around the sustainability, viability, and desirability of urban manufacturing. It is thought to be a dirty, dying industry that you don’t want near you.



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## INTRODUCTION (CONTINUED)

While there are still some types of heavy industrial facilities that you wouldn't want to live next door to, there are many more businesses that we should be happy to have in our neighborhoods. They care about their impacts on the planet and provide living-wage jobs without being disruptive or unpleasant to be around. Those stereotypical "big dirty factories" are becoming a thing of the past thanks to advances in technology and years of environmental regulations. There is plenty of data out there to prove these misconceptions wrong, but yet these commonly-held ideas persist.

Urban manufacturing brings many benefits, yet most American cities do a poor job of protecting and supporting these businesses. Due to popular misconceptions and outdated visions of manufacturing and industry, they are not only undervalued, they are seen as something to be avoided. This research aims to contribute to the goal of maintaining and expanding space for manufacturing by investigating exciting examples of how manufacturing is evolving in a way that will enable the transition toward green economies. By providing these examples, we hope to correct the misconceptions about the viability, sustainability, and desirability of urban manufacturing. If we want to preserve industrial lands for the manufacturing sector in Tacoma and support our existing businesses (as discussed in the previous chapter), it is critical that local planners utilize the tools at their disposal (Leigh et al., 2014, p. 35).

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## RESEARCH OVERVIEW

As the population of the Puget Sound region grows, land is being developed (and redeveloped) to provide housing and commercial spaces for businesses. A regional light rail system is being expanded to provide more transportation options. Increased development and the presence of public transit puts pressure on industrial lands, creating incentives for converting them to more profitable uses. This creates a challenge for urban manufacturers who can't pay the high real estate costs that commercial businesses might otherwise be able to afford. In absence of careful planning, these businesses will be forced to move outside of the city or to close down shop.

These generally small to mid-size manufacturing firms located within our cities produce anything from gourmet cupcakes to semiconductors and provide jobs for the local workforce, often at much higher salaries than jobs with similar educational requirements in other industries (Equitable Innovation Economies, 2017, p. 4). The manufacturing sector currently provides roughly 9% of jobs in the Tacoma area (EDB, 2018), and industrial and manufacturing jobs were projected to increase by 84,000 between 2012 and 2040 across the Puget Sound region (PSRC, 2015, p. E-1). Manufacturing businesses also tend to be more resilient during economic downturns (Overton & Bland, 2017).

Urban manufacturing brings multiple benefits to cities, yet most American cities do a poor job of protecting and supporting these businesses. Due to popular misconceptions, manufacturing and industry are not only not valued, but are seen as something to be avoided, even within the planning profession. Smart Growth planning principles, which gained popularity in the mid-1990s to reduce sprawl and revitalize urban areas, are likely a significant reason for the lack of inclusion of industry in local planning (Leigh & Hoelzel, 2012, p. 89). At best, manufacturing is given a brief mention, while at worst, Smart Growth views industry as a blight on the city, something to be chased out and redeveloped into trendy lofts (Bronstein, 2009). Instead of protecting industrial lands, Smart

Growth policies can inadvertently contribute to their displacement and conversion, facilitating urban sprawl. Unfortunately, manufacturing and industry need intentional support and protection through zoning and local initiatives to thrive, as they are especially vulnerable to the market. Many businesses rely on industrial-zoned lands to provide the space necessary for their facilities at affordable prices, which will be converted to more profitable uses if not protected (Bronstein, 2009, p. 30).

Our literature review uncovered the common misconceptions around manufacturing in America, and the need for a more accurate and updated understanding of what urban manufacturing looks like today and how it can be a part of a green economy. Therefore, our research confronts three commonly-held misconceptions around American manufacturing:

### MISCONCEPTION #1:

“Manufacturing and industrial uses are inherently dirty and dangerous.” When thinking of industry and manufacturing, we often think of large facilities that are filled with loud, dangerous machinery and releasing large amounts of pollution in the air, soil, and water. While some types of heavy industry, such as large mills and refining plants, will still generally need more consideration in where they are sited and what kinds of neighbors are a good fit, improved technology has reduced both the noise and pollution from industrial facilities (PSRC, 2015, p. E-4; Leigh et al., 2014, pp. 5-6). Many modern manufacturers utilize 3-D printing, CNC, and other advanced manufacturing technologies, which do not fit the “dirty and dangerous” vision of manufacturing that many people still hold (PSRC, 2015, p. E-4). The manufacturing and production sector is also becoming more sustainable. New technologies allow us to become “cleaner and greener”, such as utilizing large amounts of data to improve efficiency, which reduces waste and pollution while creating products more quickly and at higher quality (PSRC, 2015, p. E-4).

## RESEARCH OVERVIEW (CONTINUED)

### MISCONCEPTION #2:

“Manufacturing is a dying industry.” Many people think that manufacturing is a dying industry in the US due to loss of manufacturing jobs and the many American companies that have moved their production facilities overseas (Naim, 2014). However, manufacturing is resilient and continues to be a significant contributor to the US economy (Leigh et al., 2014, p. 3). One reason for this misconception might be that manufacturing looks much different than it has in recent history. Smaller-scale, specialized and local production facilities are growing at a faster rate than large-scale production that many are used to seeing (PSRC, 2015, p. E-3). Manufacturers are using technologies that were still in development even just ten years ago (PICCED, 2013, p. 1). The increase in production has also not been proportional to an increase in the number of jobs, as production and manufacturing are becoming increasingly automated (Naim, 2014). Much of the current workforce will soon be aging out, leaving many positions to fill as workers retire (Leigh et al., 2014, p. 3). Increases in transportation and foreign labor costs are also making domestic production more desirable (PICCED, 2013, p. 9).

### MISCONCEPTION #3:

“Manufacturing is an undesirable land use, incompatible with other land use types.” Zoning requirements were established in the U.S. in the late 1800s to keep factories separate from residential development, which were seen as “incompatible” due to the noise and pollution the factories generated (Albemarle County Attorney’s Office, 2015, p. 2-1). Even though many of these facilities have changed in the past 200 years, they are still largely treated the same way by the planning community - incompatible with other types of land use. With urban manufacturing’s shift away from mass-produced large-scale operations toward local production and artisanal manufacturing, urban industry can now operate in areas beyond those strictly industrial zoned (PSRC, 2015). Advancements in sound, odor and vibration pollution further

reinforce the capabilities of manufacturing within mixed-use zoning. Small- to mid-sized manufacturing and production facilities also tend to be quieter and have lower impacts due to smaller scale of production (PSRC, 2015, p. E-4).

Despite the availability of information, many of us still have a very limited and outdated understanding of modern manufacturing, and planners must do more to incorporate it into their work. Many people just don’t have a close connection to manufacturing. With a more accurate idea of what urban manufacturing looks like, how it operates, and how it fits in urban spaces, it is more likely to be planned for and protected.

We see a need for additional context around the types of manufacturing that are currently being practiced and the new technologies that are currently emerging as a part of the fourth industrial revolution, what is often called “Industry 4.0”. We know that increased automation can improve efficiency and reduce resource usage, but it also comes at the cost of blue-collar jobs. This creates a tension between the environmental protection and social equity. For the best outcomes in Tacoma, these tensions need to be acknowledged and addressed intentionally throughout the planning process and in future economic and workforce development. We frame our research with these considerations in mind while we work to bring companies to Tacoma, or even better, help to nurture home-grown businesses. The examples provided here are intended to enable readers to visualize how manufacturing can fit into the city’s green future.

We designed this research project to find out more about what changes need to be seen in manufacturing to be sustainable, taking into account both the environment and social equity, which informed the types of businesses we selected to highlight and profile. We conducted archival research on promising firms, using the B-Corp database and Cradle-to-Cradle Certification listing to help identify candidates for profiles.




# FINDINGS

## WHAT WERE WE LOOKING TO FIND?

Utilizing the Certified B-Corporation directory as well as the Cradle-to-Cradle certification, we sought companies that are located in urban areas. Proximity to transit was a desirable attribute, but did not disqualify a company from consideration. But, most importantly, we sought out companies that dispelled the three misconceptions surrounding urban manufacturing: manufacturing is inherently dirty and dangerous, manufacturing is a dying industry and that manufacturing is incompatible with other land uses.

## PROFILE 1

Company Name	<b>METHOD PRODUCTS</b>	
Founded & HQ	2000 - San Francisco, CA	
Facility Location	Chicago, IL	
Goods Produced	Environmentally friendly household cleaning supplies and personal care products.	

**ABOUT THE COMPANY**

Method Products, the maker of colorful and environmentally-friendly household cleaning supplies, says that they care about people and the planet. Later reincorporated as a public benefit corporation. Method was one of the first companies to be endorsed by Cradle to Cradle (C2C), which initially certified 37 of their products as having been designed to be sustainable from production to the end of the product's life. They now have over 60 certified products (Cradle to Cradle, n.d.).

**ABOUT THE FACILITY**

In 2015, Method opened the first LEED platinum certified soap factory in Chicago's Pullman Historic District, one of America's first model industrial towns. Method estimated the new facility would employ around 100 people in manufacturing positions, with a focus on hiring local residents. The five-acre facility is built on a rehabilitated brownfield site. The remaining 17 acres is restored with native plant species and is preserved and used as park space. The soap factory uses sun-tracking solar panels and a refurbished wind turbine to generate nearly half of their energy, and a stormwater collection system reduces their annual water usage. Greenhouses on the roof provide organic greens to local retailers (Our soap factory, n.d.).

**WHY THEY MATTER**

Method shows that you can be a profitable business while also working to do good for your community and the environment. They approached a common product in a new way to make it safer to produce, use, and dispose of.

Other companies to consider	SAFT – Bordeaux, FRA Manufacturer of li-on batteries. More than 75% of returned batteries are reused.
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## PROFILE 2

Company Name	<b>RICKSHAW BAGWORKS</b>
Founded & HQ	2017 - San Francisco, CA
Facility Location	San Francisco, CA
Goods Produced	Laptop sleeves, duffel bags, tote bags, etc.



### ABOUT THE COMPANY

The company manufactures most of its products in its own cut and sew production facility in San Francisco. Rickshaw focuses on sustainable design and manufacturing, and offers its own line of custom fabrics manufactured from recycled plastic beverage bottles and woven in the USA.

### ABOUT THE FACILITY

A small warehouse in the historic Dogpatch neighborhood that employs 13 people. The Dogpatch neighborhood is partial industrial and partial residential. In the last few years, residential expansion has increased dramatically. Most of the products are created in the cut and sew production facility within this warehouse. The warehouse—which also serves as their commercial Factory Store—is adjacent to a residential building, thus illustrating urban manufacturing can thrive in a mixed-use area (About us, n.d.).

### WHY THEY MATTER

They dispel the misconception that manufacturing is incompatible with commercial and residential zoning. They practice environmentally friendly manufacturing by using recycled plastic beverage bottles as crafting material.

Other companies to consider	Gustin – San Francisco, CA Menswear manufacturer. Utilizes crowdsourcing to create one-off apparel lines, reducing over-production waste.
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# FINDINGS (CONTINUED)

## PROFILE 3

Company Name	<b>NEW BELGIUM BREWING</b>
Founded & HQ	1991 - Fort Collins, CO
Facility Location	Fort Collins, CO
Goods Produced	Beers, Ales and Lagers.



### ABOUT THE COMPANY

3rd largest craft brewery in the United States. Created after a bicycle trip through Belgium. Some core values include kindling social, environmental and cultural change as a business model as well as environmental stewardship and cultivating potential through learning. There is a low annual turnover rate of just 3%, including natural attrition (Core Values, n.d.). The company recently agreed to be sold to Lion Little World Beverages in November, 2019. This resulted in over 300 employees receiving \$100,000 in retirement money, with some receiving significantly more (Ferrier, 2019).

### ABOUT THE FACILITY

Close to transit with a Bus Rapid Transit stop. The brewery employs approximately 400 employees and is located in a mixed-use neighborhood. Large facility capable of producing over 1 million barrels of beer annually, yet 99.9% of waste is diverted from landfills.

### WHY THEY MATTER

This was a private company until last year, but they still take care of their employees as seen by the low turnover rate and retirement compensation after the sale of the company.

Other companies to consider	Lush Cosmetics - Vancouver, CAN Skincare & Cosmetics. Sells products "naked" to reduce packaging, and thus waste.
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**PROFILE 4**

Company Name	<b>GREYSTON BAKERY</b>
Founded & HQ	1982 - Yonkers, NY
Facility Location	Yonkers, NY
Goods Produced	Brownies.



**ABOUT THE COMPANY**

Created the Open Hiring Model that supports community members returning from incarceration They also founded the Center for Open Hiring, which consults other companies on the Open Hiring Model. Currently, there are 78 bakers at Greyston that have been hired through the Open Hiring Model.

**ABOUT THE FACILITY**

Designed by Maya Lin and built in 2004 and located in a brownfield, the bakery is situated within a 21,000 square foot building that produces 7 million pounds of brownies for Ben & Jerry’s Ice Cream annually, as well as distribution to Whole Foods and online sales. 34,000 pounds of brownies are produced daily. Fifty percent of their light is natural via a skylight atrium as well as a three-story light shaft. The building is LEED® Certified (Our Impact. n.d.).

**WHY THEY MATTER**

They are providing jobs within the manufacturing industry to otherwise unlikely to be hired blue-collar workers. Jobs in the manufacturing sector pay on average more than jobs in other sectors such as retail and tend to be more stable, especially in times of economic downturn.

Other companies to consider	Cascade Engineering – Grand Rapids, MI Welfare to Career program has helped over 800 individuals off of welfare and into meaningful careers.
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# FINDINGS (CONTINUED)

## HOW (URBAN) MANUFACTURING FITS INTO A GREEN ECONOMY

According to the United Nations University Institute of Advanced Studies, not only can manufacturing fit into a green economy, it is actually a key component for creating one (UNU-IAS, 2012, p.5). In a green economy, it is equally important that manufacturing is environmentally sustainable and socially equitable, along with being profitable (UNEP, 2011).

Manufacturing is one of the five components of urban economies that need to change to enable the shift to a green economy (see box at right). The production of goods is necessary in modern society, and it isn't going anywhere. We will always need goods of some kind that we cannot make for ourselves. However, the manufacturing industry will need to make some changes to be able to properly address the environmental and social aspects of sustainability (Herrmann et al, 2014, p. 286).

Urban manufacturing, specifically, is important to making this shift. Urban cities have a significant amount of power to shift us toward a greener economy due to their “concentration of people, resources, knowledge, political power and economic activities” (UNU-IAS, 2012, p. 5). And while shifting to a green economy will take effort from many actors led by a strong governance system, the manufacturing sector will need to play a significant role (UNU-IAS, 2012, p. 5). In the spaces where cities and production overlap, there is a unique and powerful opportunity to drive this change for a better future.

### WHAT IS BEING DONE ALREADY AND WHAT CHANGES NEED TO BE MADE?

Fostering a green economy is not the only reason for manufacturers to embrace sustainability – it is increasingly popular with consumers, it can provide cost-savings to businesses, and many companies see it as the right way to do business (NAM, 2019; Herrmann et al, 2014, p. 284). This is why, across the manufacturing industry, companies of all sizes are making changes to improve the sustainability of their facilities and products they make (NAM, 2019).

**Five components of the urban economic process that need to change to make the shift to a green economy:** (UNU-IAS, 2012, p. 5)

1. Transformation of space
2. Production and consumption
3. Trade and transportation
4. Social and ecosystem services
5. Knowledge generation

Current approaches to improving sustainability in manufacturing focus on improving efficiency, reducing resource and energy use, and trying to reduce pollution emissions (Herrmann et al, 2014, p. 287).

Industry 4.0 has recently drawn attention and renewed interest to manufacturing and urban industry (Stock & Seliger, 2016). The increased efficiency that comes with automation and envisioned “smart factories” of the future will have some positive environmental impacts (Stock & Seliger, 2016, p. 539). However, those impacts may not be significant, as they are just minimizing negative impacts instead of rethinking how those impacts could be avoided in the first place. Industry 4.0 will also likely result in a significant loss of blue-collar jobs due to changes in job skill and training requirements for entry- and mid-level manufacturing positions (Madsen, Bilberg, & Hansen, 2016). Good-paying blue-collar jobs in manufacturing need to be preserved and made more accessible, not eliminated with more barriers created.

These approaches have made positive impacts, with manufacturers contributing 19 percent more value to the American economy while releasing 10 percent fewer GHG emissions over the past 10 years (NAM, 2019, p. 3). But this approach is only useful in the short-term. A “damage management” strategy of

***Katerra’s state-of-the-art cross-laminated timber (CLT) factory in Spokane, WA uses CNC machines and artificial intelligence to make the most out of their materials, reducing waste (Katerra, 2019).***

focusing on efficiency and minimizing resource use won’t be an effective long-term solution; instead, focus must be directed toward strategies like using closed-loop (or “circular”) production supply chains, and designing products for longevity, serviceability, disassembly, and recycling (Herrmann et al, 2014, p. 287; Rahimifard et al, 2009, p. 86). With increased public pressure to be more sustainable, as well as “right to repair” and “product take-back” legislation, these ideas are being adopted by an increasing number of companies (Rahimifard et al, 2009, p. 80).

- A closed-loop supply chain reuses recycled material to make new products, eliminating the need to extract new resources from the Earth. Manufacturers are already working toward this by using more recycled materials in their production.
- Designing for longevity means that products are made to higher quality standards with increased durability so that they last longer and need to be replaced less often.
- Designing for serviceability allows for products to be repaired instead of needing to be replaced, and to allow users to repair themselves or take it to an independent repair shop, rather than going directly to the manufacturer.
- Designing with consideration for end-of-life disassembly and recycling has the biggest impact on how resources can be recovered and remanufactured once a product has reached the end of its usable life (Rahimifard et al, 2009, p. 85).

Another beneficial product design change is swapping out dangerous and environmentally damaging materials for alternatives, which makes products safer for the blue-collar workers making them, as well as for the consumers who use them

(McDonough & Braungart, 2013). An example from the book “The Upcycle” described how the authors worked with a textile mill to develop a healthful textile by removing toxic materials from the production process and only working with neutral or positive ingredients (McDonough & Braungart, 2013, p. 72-73). This design change resulted in a safer product, as well as a safer production process where workers no longer needed protective gear, the facility didn’t need to store hazardous chemicals, and the “waste” water generated from the production of the material was completely clean. Mervin Manufacturing in Sequim, WA has worked to find alternatives to the materials being used in most other snowboard manufacturing facilities, going so far as to develop new processes to allow for using more environmentally friendly materials (Mervin Manufacturing, n.d.). They are able to recycle all of the wood and plastic waste created in their facility and operate without generating any hazardous waste.

***Caterpillar has adopted the responsibility of taking their products back from consumers and remanufacturing them in-house (Caterpillar Remanufacturing Services, 2007).***

Finally, manufacturing can become more sustainable by producing less. It is common for companies to manufacture more items than they can sell, resulting in the excess being sent to landfills, or burned (Cernansky, 2020). This is a significant problem in the fashion industry, which sends large amounts of unsold and returned clothing and excess fabric to landfills every year (Cernansky, 2020). Gustin Menswear tackles this problem using crowdsourcing to identify buyers for product before they make it, ensuring they don’t over-produce (Gustin Menswear, ND). For smaller manufacturers, overproduction wastes labor and resources; Gustin’s crowdsourcing approach allows them to make high-quality items but still sell them at lower prices because they don’t have to make up for that waste (Gustin Menswear, ND)

## CONCLUSION

We need urban manufacturing in our cities, and in this paper we showed why we should also want them here. Urban manufacturing is a key component of creating a green economy. The manufacturing industry can lead the way by making changes to the way they design and produce goods. Many companies are already doing this work and are finding ways to retool their production systems to close the loop and become circular. Manufacturing has the greatest ability to make the change to a circular economy, as they can change the types of materials they use, how they are sourced, and how well products are designed for longevity, serviceability, disassembly, and recycling. However, this work can't only be put on manufacturers. We, as consumers, need to change our consumption habits. Buying fewer items, spending a bit more for higher quality, and repairing things before replacing them are all ways we can help reduce the environmental impacts from manufacturing.

Besides helping the environment, manufacturing can also help people by providing them with good jobs that pay a living wage, without having to get specialized or advanced education. As more manufacturers switch to using safer materials, these blue-collar jobs will become even safer for those working on production lines. The rise of Industry 4.0 threatens these jobs, which is something that should be kept in mind when thinking about what kinds of businesses cities want to attract and support. Industry 4.0 also does not provide significant environmental benefits for manufacturing, though that doesn't mean we should discount it completely. Industry 4.0 can actually be very helpful in the end-of-life processing of goods. Automation and AI can help companies sort through and disassemble products to be resold, repurposed, or recycled (Cernansky, 2020; Rahimifard et al, 2009, p. 84).

Not only do we need and want urban manufacturing, we have it already. And despite common ideas about manufacturing, it is compatible with other land use types. As facilities become more sustainable,

***“Achieving sustainability and energy-efficiency goals helps strengthen manufacturers’ competitiveness and fiscal bottom lines. However, identifying energy-saving opportunities and sustainability strategies can be challenging for small and medium-sized manufacturers. The percentage of companies engaged in sustainable practices decreased for medium-sized businesses (56.3 percent) and small businesses (38.9 percent).”***

*(NAM, 2019, pp. 5-6)*

they will likely become even better neighbors, with fewer emissions and waste. Companies included in this chapter, such as Rickshaw Bagworks, show how well these businesses can fit into a mixed-use neighborhood. This is great for cities since it helps to create a greater diversity of businesses, which provides diversity of jobs and can allow for creation of industrial ecosystems. Urban locations are also great for businesses because they are closer to suppliers and customers, they have better access to services and to their employment base. Their employees also have shorter commutes and often have better access to public transportation, as shown in the example of New Belgium Brewing.

Looking forward, many of these changes will rely on governance of local cities as well as federal regulations to encourage businesses to start making these changes. Businesses benefit from increasing sustainability, but these kinds of changes are more challenging for smaller businesses. It will be important to find ways to support these businesses so that they can make the changes necessary to change their production processes while still remaining competitive.



