

**PATHWAYS TO GREEN MANUFACTURING**  
**A Topical Brief Prepared for the**  
**Green Urban Manufacturing Initiative (GUMI) Roundtable**

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# **TABLE OF CONTENTS**

<b>EXECUTIVE SUMMARY</b>	<b>4</b>
<b>INTRODUCTION</b>	<b>7</b>
<b>GREENING THE SECTOR</b>	<b>8</b>
<i>Principles for Greening the Sector</i>	9
<i>Greening the Sector: Firm Profile, American Apparel</i>	10
<i>Greening the Sector: Chicago Waste to Profit Network</i>	11
<i>Greening the Sector: EPA Metal Products Manufacturing Program</i>	12
<i>Greening the Sector: Food Manufacturing</i>	12
<b>TRANSFORMING THE SECTOR</b>	<b>15</b>
<i>Transforming the Sector: Markets for Eco and Ethical Apparel</i>	15
<i>Los Angeles Apparel Manufacturing Cluster</i>	16
<i>Transforming the Existing Apparel Manufacturing Sector</i>	18
<i>Transforming the Sector: Markets for Sustainable Furniture</i>	22
<i>Los Angeles Furniture Manufacturing Cluster</i>	23
<i>Examples of Sustainable Furniture Products and Manufacturers</i>	23
<i>City Governments Spurring Eco-Products: Syracuse, New York</i>	24
<b>RECOMMENDATIONS</b>	<b>25</b>
<b>REFERENCES</b>	<b>27</b>
<b>APPENDICES</b>	<b>30</b>

## EXECUTIVE SUMMARY

Traditional ways of manufacturing are becoming increasingly costly and harmful to the environment. Additionally, consumers are demanding more sustainable products than ever before. Manufacturers that find a way to mitigate their climate-change risks and reduce their environmental impact, while seeking out opportunities for business in new green markets, will generate a competitive advantage over competitors in an increasingly resource constrained future.

The paths manufacturers can take toward sustainability can be categorized as either efforts that green production processes or produce end products suited to the green marketplace. This topical brief will present insights as to how existing apparel, furniture, food, and metals manufacturers and stakeholders in the public sector have sought to *green the sector* by changing production processes and/or *transform the sector* by branching into sustainable supply chains to produce green end products. There are several examples of manufacturers and global supply chains around the world that have already embraced both processes—greening their production and the products they produce—and in turn have improved the environment and standard of living for many people, while at the same time securing their economic viability in the future. These examples provide timely insight and ideas for the City of Los Angeles as it develops strategic initiatives to green its existing manufacturing base.

The first path, coined *greening the sector*, that manufacturers can take towards sustainability focuses on greening production processes. Initiatives aimed at stretching resources further, reducing energy needs and water consumption, relying on renewable resources, and eliminating waste have been embraced by a variety of manufacturers across different sectors. These environmental improvements fit within a traditional business framework called *lean* manufacturing. With a few changes to traditional *lean* models, such as using longer time horizons to assess economic feasibility; including environmental impact criteria; and focusing on the entire life cycle of a product, companies will find they already possess many of the skills and tools necessary to shift to sustainable production processes.

*Greening the sector* strategies help firms compete based on low-cost advantages and are important for reducing the negative environmental impacts on the surrounding community. These strategies may also allow a company to expand and add jobs in the long run, if lower production costs translate to increased market share.

Manufacturers cannot be expected to navigate the switch to sustainable processes alone. Whether it be the facilitation of an eco-industrial park or recycling network, where waste from one manufacturer is used as inputs for another, or grants for research on green production processes, public sector involvement is necessary for a manufacturing cluster to reach its fullest sustainable potential. Additionally, the public sector, academia, and local non-profits serving as market intermediaries must set the stage for *cooperation*, cooperation between competing firms, within the manufacturing cluster to help advance the common goals of emissions reductions or enable the sharing of technology necessary to revolutionize a city's manufacturing base. This concept alone can unlock a region's competitive advantage, but usually requires public sector initiative and incentives to start.

The second path manufacturers can take towards sustainability is through greening or *transforming* end products. In order to make end products suited to new green markets, manufacturers must identify and understand manufacturing trends in niche green markets

nationally and internationally, the organization of production and supply chains, and the market demand for less toxic, resource-efficient products. Making product transformation a top priority adds value in two important ways: first, as a revenue driver, through product differentiation and increased demand as consumers increasingly search out ethical clothes; and second, through intangibles which help build a brand and a loyal following and also provide a social and environmental purpose for employees.

Producing green end products requires access to sustainable inputs and may include replacing elements of a supply chain. Market intermediaries, green-certifying entities, and others play an integral role in connecting existing manufacturers to more sustainable raw materials and resources within nascent supply chains. These networks can drastically reduce the costs of researching and testing new supplier relationships.

*Transforming the sector* strategies can make firms more competitive through expansion into new markets and thus increase employment opportunities. These strategies are often tied to green production processes, but not in every case. It is important to note that a new green product doesn't necessarily mean the production processes are non-polluting and without impact on the surrounding communities.

### ***Manufacturing in Los Angeles***

Los Angeles has four of the nation's largest manufacturing sectors in apparel, food, furniture, and metal. For the sectors to ensure their economic viability as well as improve the environment and lives of people in the surrounding communities, these manufacturing clusters must make an effort to green production processes and/or to expand into green end products. Piecemeal attempts at change by isolated manufacturers will not achieve the wide-scale development of competitive green clusters that are necessary to make Los Angeles a green manufacturing hub. Rather, interested stakeholders, government officials, city planners, as well as private sector intermediaries, need to work together to achieve the sector-wide transformation capable of turning Los Angeles into a thriving green manufacturing center, ensuring a better environment and competitive local economy for the region.

### ***Recommendations***

Several different stakeholders, including government officials, planners, academia, retailers, and community organizations, have a role to play in creating a robust, green urban manufacturing sector in Los Angeles. The following is a list of recommendations gleaned from case studies presented in this brief and from Causemopolis' network of practitioners.

- 1) *Shape and accelerate sustainable markets in traditional sectors where Los Angeles already enjoys a competitive advantage.*
  - Regularly showcase and facilitate networking between local sustainable industry players through green product trade shows and expos.
  - Organize *buy local* campaigns to influence and re-organize supply chains to favor local manufacturers.
  - Increase demand for sustainable versions of products already produced in Los Angeles through sustainable purchasing policy incentives for government and small business.

- 2) *Foster coopetition through public investment that encourages existing firms within the same industry and across a supply chain to work together to implement sector-wide sustainability strategies.*
  - Gather leaders of companies to set industry-wide goals for sustainable, competitive growth (similar to the Northwest Food Processing Association Energy Roadmap).
- 3) *Establish market intermediaries that can effectively coordinate supply and demand in nascent green product markets and for closed-loop manufacturing outcomes. This role would include coordinating the supply of a trained workforce.*
  - Increase communication between local sustainable manufacturers and community colleges, trade techs, and universities. Work with third party organizations to tailor curriculum for educating students in the core competencies of sustainability as it applies to specific industries.
  - Connect manufacturers with data and information on sustainable sources of raw materials, certifying organizations, and green-focused trade associations.
- 4) *Institute “blended value policy making” where all legislation and implementation includes social, economic, and environmental outcomes for the region.*
  - Encourage local government and economic development practitioners to integrate sustainability and the greening of industry into traditional economic development plans. Public sector investment and incentives should flow out of rigorous market analysis as to which manufacturing sectors have the greatest potential to grow as a result of implementing sustainable production processes or tapping core competencies to create new green end products.
  - Ensure that all environmental policies translate into increased demand for locally produced green products.

# INTRODUCTION

The earth's ability to sustain life and the related economic activity is becoming threatened by the old processes of extracting, processing, transporting, and disposing of the flow of products and resources. Even manufacturers who are skeptical about the dangers of climate change cannot ignore the fact that, because so many others *are* concerned, the phenomenon has wide-ranging implications for their industry. Investors are already factoring in the material risk of climate change in company valuations, and businesses are facing higher raw material and energy costs as governments increasingly enact policies that regulate emissions.<sup>1</sup> Additionally, more and more consumers are taking into account a company's social and environmental policies when making purchasing decisions.<sup>2</sup> In sum, these external forces are converging, and make the traditional way of doing business increasingly costly, both monetarily and environmentally.

Manufacturers that find a way to manage and mitigate their exposure to climate-change risks and reduce their environmental impact, while seeking new opportunities for profit, will maintain a competitive advantage in a carbon and resource constrained future.<sup>3</sup> A growing number of manufacturers across different industries are making their processes more efficient, less costly, and ultimately reaping the rewards in expanding *greenmarkets*<sup>4</sup>. Beyond accounting for environmental impacts, a handful of firms in sectors like apparel and furniture are also including positive social metrics for labor and community engagement as a part of their business models. These social enterprises or triple-bottom line businesses are at the forefront of true commercial sustainability.

This topical brief will present insights as to how existing apparel, furniture, food, and metals manufacturers are responding to the demand to reduce carbon emissions and produce less toxic, more resource-efficient products. And in some cases, the brief will highlight how niche industries are going beyond *green* to include positive social impact. The brief also shares specific examples of companies and sector initiatives in different stages of adopting green strategies to serve as useful examples to Los Angeles' existing apparel, furniture, food, and metals manufacturing sectors looking to adopt new green practices in a competitive landscape.

When discussing the topic of Green Manufacturing, we've identified two distinct paths existing manufacturers can choose in order to remain competitive and even gain new market share in the nascent eco-conscious world. First, traditional manufacturers can choose to *green the sector* by changing production methods, or *transform the sector*<sup>5</sup>—changing the actual end products produced to meet a growing demand for less-toxic, green goods. It is important to note, that these two paths can be one and the same or be unrelated to one another. For example, a product we think of as *green* such as solar panels requires a production process that uses toxic elements and is not necessarily resource-efficient. On the other hand, energy efficient windows that meet LEED- certification produced in a green

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<sup>1</sup> Jonathan Lash & Fred Wellington, *Competitive Advantage on a Warming Planet* in HARVARD BUSINESS REVIEW ON GREEN BUSINESS STRATEGY, 125 (2007).

<sup>2</sup> *Id.* at 125

<sup>3</sup> *Id.* at 125

<sup>4</sup> *Green markets* refer to sub-markets that develop within traditional product markets due to a new demand for a greener version of a good.

<sup>5</sup> Joan Fitzgerald uses this term in her recent book, *Emerald Cities*, however we use it in this brief to specify the transition of industry into new green product markets, thus transforming the sector and altering supply chain as the shift occurs.

facility with recycled water and glass strategies from both paths – *greening and transforming the sector*. These paths also include a wide spectrum of activities that may be industry specific or be applied broadly across all manufacturing firms and range from deep measures to small changes. Lastly, it is important to note that true sustainability includes social metrics. However, the word *sustainability* is often used as a synonym for *green* and in those instances only refers to eco versus ethical. This distinction is especially true when Americans use the word as compared to our European counterparts. In most cases this brief will follow suite and use *sustainability* and *green* interchangeably. However, in some cases we will highlight the social aspects of firms who are embracing the full meaning of sustainability.

Neither path to green manufacturing is straightforward or simple for individual firms at this moment in history. Each path requires significant support and collaboration by market intermediaries, players in the local supply chain, the public sector, and consumer advocacy groups in order to scale interventions necessary to create a thriving, green manufacturing sector in Los Angeles. Although the transition requires unprecedented public-private partnership, manufacturers across many different industries around the world have already begun to adopt the processes of *greening and transforming*; and in turn have improved the environment and the standard of living for many people, while also ensuring their own economic viability well into the future.

## GREENING THE SECTOR

The first path to Green Manufacturing, *greening the sector*, addresses how manufacturers can make their production processes more environmentally sustainable. Sustainability is often defined as “meeting the needs of the current generation without compromising the ability of future generations to meet their needs”<sup>6</sup> and often invokes reference to “people, planet, and profit.”<sup>7</sup> The concept of environmental sustainability in the manufacturing process aligns perfectly with the already recognized and often practiced business framework of lean manufacturing, which refers to eliminating as much waste from a process as possible for efficiency sake. However, until recently, lean manufacturing practices typically focus on measures that reduce costs, using a short-term time horizon rather than focusing on changes that improve the environment while still being cost-effective in the long-term.<sup>8</sup> Strategies for *greening the sector* that can also be found in most lean manufacturing initiatives include: stretching resources further, reducing energy needs and water consumption, relying on renewable resources, and eliminating waste.

Lean manufacturing efforts traditionally start with individuals and/or teams within an organization evaluating all parts of the production process to identify what value each step adds economically, and how to make those existing processes better.<sup>9</sup> These same individuals and/or teams then dedicate resources and time to identify opportunities, investigate them, and implement improvements.<sup>10</sup> The shift from a lean strategy to a sustainable strategy is

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<sup>6</sup> Gary Langenwalter, “*Life*” is Our Ultimate Customer: From Lean to Sustainability from GREEN MANUFACTURING: CASE STUDIES IN LEADERSHIP AND IMPROVEMENT, 2 (Association for Manufacturing Excellence 2008).

<sup>7</sup> *Id.*

<sup>8</sup> *Id.*

<sup>9</sup> Gary Langenwalter, “*Life*” is Our Ultimate Customer: From Lean to Sustainability (2008), available at [http://www.zerowaste.org/publications/Lean\\_to\\_Sustainability.pdf](http://www.zerowaste.org/publications/Lean_to_Sustainability.pdf).

<sup>10</sup> *Id.*



easily accomplished—a company need only change their decision-making criteria from a focus on the economic customer to the three bottom lines of profitability, people, and planet.<sup>11</sup> Similar to lean thinking, sustainability efforts start with educating people at all levels in a company to use a more holistic decision-making criteria, ask poignant questions, and ultimately evaluate success based on a triple-bottom line.<sup>12</sup>

Many of the traditional tools already used in any lean approach—value stream maps, work teams, analysis tools such as Pareto charts, Ishikawa diagrams and the “5 why’s”—can be easily adapted and used to green production processes for sustainable outcomes.<sup>13</sup> For example, a company can add environmental metrics such as hazardous material used/generated, water used, or energy used to their value stream map, or categorize hazardous material and releases of toxic substances as process defects that need to be eliminated.<sup>14</sup>

Implementing production processes designed to protect the environment and minimize energy use is not only a good idea for the planet; it also can reduce costs and lower risks. A company that looks to make its production process more sustainable also improves output, quality levels, flexibility, and optimization of manufacturing assets, as well as reducing scrap materials and waste.<sup>15</sup> From a social perspective, manufacturers can also achieve greater employee engagement by encouraging workers to apply a passion for the environment and a healthy society through the improvement of production processes and workplace safety.<sup>16</sup>

### *Principles for Greening the Sector*

Where the traditional methods of manufacturing are focused on financial short-term thinking, sustainability is the complete opposite. Sustainability is goal oriented, long term thinking, which causes practitioners to look at the long-term unintended consequences of their processes.<sup>17</sup> Where conventional business assumes an inexhaustible supply of raw material, sustainability assumes that resources are finite, and therefore should be used and re-used again and again.<sup>18</sup> Additionally, when thinking sustainability, anything that damages the ability of the earth to sustain life should be reduced or eliminated. To combat the problem, sustainability looks to intentionally redesign processes so that outflows become useful inflows of other processes.<sup>19</sup>

When a company looks to make its process more sustainable, three key rules must be applied. First, it must look to preserve as much “natural capital” such as soil, air, and water as possible.<sup>20</sup> If these resources are spoiled, the ability of the earth to support present and future life is severely harmed. For example, one way a manufacturer applies this principle is by using water treatment systems on site to recycle and reuse water in the production process.

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<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

<sup>13</sup> *Id.*

<sup>14</sup> Gary Langenwalter, “Life” is Our Ultimate Customer: From Lean to Sustainability (2008), available at [http://www.zerowaste.org/publications/Lean\\_to\\_Sustainability.pdf](http://www.zerowaste.org/publications/Lean_to_Sustainability.pdf).

<sup>15</sup> Jenni Cawein & Rob Currie Introduction, GREEN MANUFACTURING: CASE STUDIES IN LEADERSHIP AND IMPROVEMENT, viii (Association for Manufacturing Excellence 2008).

<sup>16</sup> *Id.*

<sup>17</sup> *Supra* note 6, at 3.

<sup>18</sup> *Id.*

<sup>19</sup> *Id.*

<sup>20</sup> *Supra* note 6, at 4.

Second, the manufacturer needs to look for sources of “natural income” to power and sustain processes.<sup>21</sup> Natural income is comprised of the resources that nature replaces in large quantities daily, such as solar energy, wind power, and water power to name a few. Although fossil fuels are technically versions of natural income, they are much more finite and the process of turning them into energy negatively impacts the environment. Therefore, in looking for natural income, a manufacturer must reduce or eliminate reliance on fossil energy, replacing it with renewable energy or by reducing energy consumption through energy efficiency upgrades.

The third major rule of sustainable manufacturing is to reduce waste and toxics from the production process.<sup>22</sup> Space to dispose of hazardous materials is shrinking, and the long-term effects of constant dumping and emitting on people’s health and the environment is largely unknown. It is known that, in the short-term, landfills can cause groundwater contamination, emit harmful gases, create public nuisances, and devalue land.<sup>23</sup> Eco-industrial parks are an innovative, new solution companies and communities can use to implement the third principle where waste is used as an input for another industry production process, thereby eliminating some, if not all, waste normally bound for a landfill.<sup>24</sup> See Appendix A for a few examples of firms employing innovative *closed-loop* manufacturing processes.

Overall, most *greening the sector* interventions involve making manufacturing facilities more energy efficient through energy retrofits, employing renewable energy sources to power production process, installing water recycle and purification systems, implementing waste-reduction programs and recycling on-site, and empowering employees to actively participate in greening the production process.

The following is a snapshot of manufacturers who have embraced *greening the sector* strategies in their respective industries, and examples of public initiatives designed to assist manufacturers’ switch to more sustainable practices.

### *Greening the Sector: Apparel Manufacturing*

American Apparel, a Los Angeles-based clothing manufacturer, has used a vertically integrated manufacturing model to become an industry leader in sustainable manufacturing. For American Apparel, vertical integration reduces their carbon footprint by concentrating manufacturing operations within a small circle of buildings in downtown Los Angeles. Vertical integration, by definition, shrinks a company’s carbon footprint because the materials are not shipped around the globe during the production process. By centralizing the designing, dyeing, knitting, storage, cutting, and sewing, the company is able to ensure processes comply with environmental regulations regarding effluents, waste disposal, airborne particulate matter, and other pollutants. Additionally, American Apparel has found creative ways to reuse scraps from its production process, reusing them again and again to create new apparel or selling them to third parties for use in a variety of end products.

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<sup>21</sup> *Id.*

<sup>22</sup> *Id.*

<sup>23</sup> For details on these examples as well as other impacts of landfills see Carla Dickstein & Greg Sayre, *The Socioeconomic Impact of Landfills*, available at <http://www.rri.wvu.edu/pdf/landfills-dickstein.pdf>.

<sup>24</sup> For a list of “parks” already operating in the United States and the detailed plans see *Existing and Developing Eco-Industrial Park Sites in the U.S.*, available at [http://www2.ucsc.edu/gei/eco-industrial\\_parks.html](http://www2.ucsc.edu/gei/eco-industrial_parks.html).

American Apparel utilizes alternative sources of energy to power its production processes by installing solar panels that generate 150 kilowatts of energy—accounting for approximately 15 percent of their energy use. Finally, American Apparel’s commitment to sustainability also extends to their employee’s carbon footprints, as the company provides bikes, locks, and helmets to employees who wish to bike rather than drive to work. American Apparel serves as a good example of an apparel manufacturing company employing a variety of *greening the sector* strategies—limiting waste and emissions, using alternative energy sources, reducing employees’ carbon footprints—employed in order to make the apparel manufacturing process more sustainable, and ultimately more competitive. *The afore mentioned information is available online at [www.americanapparel.com](http://www.americanapparel.com).*

### ***Greening the Sector: Public-Private Partnership, Chicago Waste to Profit Network***

The current system of recycling and reusing manufacturing waste is broken and fragmented, with many layers of brokers, in which most companies have only been in business for a few years.<sup>25</sup> As a result, manufacturers find it difficult to recycle or reuse waste in cost-efficient ways. Helping to solve this problem, The Chicago Waste to Profit Network developed as a tool to link companies together in symbiotic relationships where the waste of one manufacturer becomes a resource input for another.

Through the network, the city as whole reaps the benefit of waste reduction and member businesses save money by reducing waste collection costs and the cost of inputs.<sup>26</sup> The network began with 26 companies in and expanded to over 100 businesses one year after the network’s creation.<sup>27</sup> Member companies pay annual dues to have access to input and waste information from other participating companies in the hopes of identifying possible synergistic relationships. In its first year, the network diverted more than 20,000 tons of waste destined for landfills, and the network realized \$4.5 million in cost savings and new revenue creation while reducing carbon dioxide emissions by almost 50,000 tons.<sup>28</sup>

The network would never have been possible without public sector collaboration. The Chicago Department of the Environment was tasked with developing strategy for expanding industrial activities in the region.<sup>29</sup> At the same time, the Chicago Manufacturing Center began collaborating with the U.S. Business Council for Sustainable Development to create a business byproduct synergy network modeled after the National Industrial Symbiosis Programme in the U.K.<sup>30</sup> The two Chicago entities formed a partnership to start the network and used city leadership to gather funding from the regional Environmental Protection Agency, Illinois Department of Commerce and Economic Opportunity Recycling Expansion and Modernization Program, and the National Institute of Standards and Technology’s Manufacturing Extension Partnership.<sup>31</sup>

The network as a whole, formed through the public-private partnership, functions as a market intermediary to connect latent demand with supply in the manufacturing reuse and recycling marketplace. The partnership equipped the Chicago Manufacturing Center to play an indispensable role as network facilitators by collecting data on firm inputs and outputs,

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<sup>25</sup> JOAN FITZGERALD, EMERALD CITIES: URBAN SUSTAINABILITY AND ECONOMIC DEVELOPMENT, 136 (2010).

<sup>26</sup> *Id.* at 135.

<sup>27</sup> *Id.* at 136.

<sup>28</sup> Data from Chicago Manufacturing Center website, <http://www.cmcusa.org/index2.cfm>.

<sup>29</sup> *Supra* note 25 at 135.

<sup>30</sup> *Supra* note 25 at 135-36.

<sup>31</sup> *Supra* note 25 at 136.

analyzing the profitability of potential synergies, chronicling stories of successful exchanges, calculating cost savings, and recording job creation and retention to communicate the value of the network.<sup>32</sup>

For manufacturers in Los Angeles eager to reduce waste and the cost of raw materials, a similar network would be a valuable solution and contribute to *greening the sector*. Facilitating similar synergistic relationships between sectors of manufacturers would enable firms to be more profitable and the City of Los Angeles to also achieve important waste reduction goals. As demonstrated with the Chicago Waste to Profit Network, public sector entities have an important role to play in providing the initial investment for the creation of a network that ultimately created a market, as well as providing the technical support and data needed for the network to run smoothly and demonstrate value to members.

### *Greening the Sector: EPA Metal Products Manufacturing Research Program*

Of particular interest to Los Angeles' metal manufacturing sector, is the EPA's new metal products manufacturing research program, which looks to identify problems and deliver solutions for environmental improvements in metal product production based on sustainable technology in the industry.<sup>33</sup> The industry has drawn particular attention from the EPA because it is ranked in the top ten of the most polluting industries in the country.<sup>34</sup> In order to reduce pollution, metal manufacturers are encouraged to reduce the use of toxics, prevent the release of large volumes of wastewater, hazardous waste or air emissions containing toxic pollutants, and improve energy conservation efforts.<sup>35</sup> These goals are all made possible through the emergence of new technologies in advanced casting techniques, environmental-friendly metal working fluids, and new surface cleaning technologies.<sup>36</sup> Stakeholders spearheading the greening of the metal manufacturing sector in LA are encouraged to contact the EPA to find out more about these emerging technologies, which could contribute to significant steps towards sustainability.

### *Greening the Sector: Food Manufacturing*

Food manufacturing, also known as *food processing* is another industry that has seen advances in lean, sustainable production processes. Across the country, these manufacturers are executing a wide range of sustainability initiatives, from broad strategies such as energy and green master planning and LEED plant certification, to more focused strategies such as managing utility costs in more efficient and sustainable ways.<sup>37</sup>

For a company looking to ensure sustainable food production, effective management of water and natural gas resources can be a valuable place to start. For instance, water and natural gas are used in abundance in older plants for heating and cooling products.<sup>38</sup> Companies that have adopted creative ways to reuse water and waste heat from their

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<sup>32</sup> *Id.*

<sup>33</sup> EPA's Industrial Multimedia Metal Forming Program, details available at : <http://www.epa.gov/nrmrl/std/mtb/metalfforming.htm>.

<sup>34</sup> *Id.*

<sup>35</sup> *Id.*

<sup>36</sup> *Id.*

<sup>37</sup> Area Development Online, *Beneficial Strategies for Sustainable Food Processing*, <http://www.areadevelopment.com/FoodProcessing/august09/sustainable-food-processing-energy-costs010.shtml>.

<sup>38</sup> *Id.*

processes have become much more efficient and sustainable. A good example of this comes from a ready-to-eat soup plant in the Midwest. In the past, the plant employed a once-through process for the immersion cooling of soup cans, using approximately two million gallons of water per day.<sup>39</sup> The company hired engineers to design a recirculation process to make their manufacturing more sustainable and efficient. The engineers designed a cooling loop system which recovers process cooling water after use and pipes it to heat exchangers, where it is cooled indirectly by a cooling tower, and then returned to the process.<sup>40</sup> The system cost the company approximately \$4 million, but the project has already met a 2-5 year payback with a 40 percent return on investment benchmark.<sup>41</sup> The company has become more sustainable and as a result has greatly reduced its energy costs.

Similarly, a Midwest condiment manufacturing plant found a creative way to return heat to their production process, making the firm more efficient and sustainable. The condiment plant was using an old heat exchange system with once-through city water as the heat exchange medium, leaving all the resulting hot water to drain into the sewer. The plant installed a recirculation-cooling loop that resulted in a \$4.60 per thousand gallons of water savings and also provided for the cooled water to be piped to a heat exchanger to preheat ingredients at the front of the process, saving on the cost of natural gas.<sup>42</sup> The \$1.25 million project saves the company \$500,000 a year, and fulfills water conservation goals.

These strategies resulted from companies looking at the end result—a particular performance goal they wanted to achieve for their processes, which to note was not necessarily driven by environmental goals, —and then hiring an engineering team to deliver the results using best practice technology from the industry.<sup>43</sup> This provides the important lesson to plant owners that they need not accept the performance of their existing systems and equipment. Through new production technology, they can instead dictate the level of performance they require, and thus simultaneously realize positive economic and environmental outcomes.

#### **Northwest Food Processors Association – A Sector-wide Collaboration**

A wholesale change towards more sustainable manufacturing processes in any industry cannot be achieved on a firm-by-firm basis. Instead, collaborative efforts between a variety of stakeholders are necessary to achieve the best results for a region. The Northwest Food Processors Association Energy Roadmap is a prime example of a collaborative effort within a region aimed at sustainable manufacturing. The Association, a collection of 140 food processors from the Pacific Northwest, adopted an aggressive approach to managing their energy costs, reducing their gas emissions, while at the same time increasing their productivity and economic growth through the implementation of energy efficiency.<sup>44</sup>

At a workshop in 2009, the group set a member-wide goal to reduce energy (electric and fossil fuels) intensity (energy used per unit of output) by 25 percent in 10 years,

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<sup>39</sup> *Id.*

<sup>40</sup> *Id.*

<sup>41</sup> *Id.*

<sup>42</sup> Area Development Online, *Beneficial Strategies for Sustainable Food Processing*, <http://www.areadevelopment.com/FoodProcessing/august09/sustainable-food-processing-energy-costs010.shtml>.

<sup>43</sup> *Id.*

<sup>44</sup> Northwest Food Processor Association Knowledge Exchange, *Energy Roadmap Project Put NWFPFA Membership on the Road to Change*, <http://www.nwfpa.org/nwfpa.info/sustainability-blog/55--energy-roadmap-projects-put-nwfpa-membership-on-the-road->.

and 50 percent in 20 years.<sup>45</sup> From over 500 ideas for reducing energy intensity that were submitted, the Association created the NWFPA Energy Roadmap.<sup>46</sup>

The NWFPA Energy Roadmap is a strategic document used to guide energy reduction efforts. Several energy roadmap projects are now underway and they include:

- 1) Baseline Energy Intensity Project: The goal is to establish a 2008 energy intensity baseline for members to measure progress toward achieving the industry's energy reduction goals as well as tracking energy efficiency improvements;
- 2) Access to Energy Data Project: The project objective is to provide better data to members about their energy use, enabling better decision-making in the future. The process involves in-plant tests of alternative methods of collecting and analyzing energy data to identify the most user-friendly and appropriate methods for food processor use;
- 3) Energy Assessment and Mapping Pilot: This process involves energy audits conducted to identify the 10-year energy savings potential in a sample of food processing plants and analyze the results against the energy intensity reduction goal.<sup>47</sup>

The NWFPA launched this ambitious program in response to growing recognition that the old way of manufacturing posed a risk to companies future competitive advantage, considering rising energy costs and an increased demand sustainable products. Through the collaboration, the members have put themselves on the path towards sustainability and are ensuring they remain on the cutting edge of the food processing industry.

Los Angeles, which is home to one of the nation's largest food processing sectors, could gain large-scale environmental and economic benefits from adopting more sustainable production practices in this manufacturing sector. As is the case with metal, furniture, and apparel manufacturing, Los Angeles cannot afford to continue production using outdated systems or risk losing market share to cities and companies who are adopting *greening the sector* strategies in food processing.

Leading manufacturers from around the world have begun to look at their existing manufacturing processes with a long-term economic and environment perspective, and are turning towards sustainable solutions that enhance the bottom-line. Where the focus was once on end-of-pipe solutions, the new frontier is closed-looped, circular production systems that focus on product life cycles and use integrated environmental strategies and management systems to create the most efficient, least wasteful production processes possible.<sup>48</sup>

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<sup>45</sup> Information from a phone interview conducted on Sept. 2, 2010 with Sergio Dias of Sergio Dias Consulting. Sergio was an instrumental leader in facilitating the workshop and organizing the program..

<sup>46</sup> *Supra* note 44.

<sup>47</sup> *Supra* note 44.

<sup>48</sup> OECD Sustainable Manufacturing and Eco-Innovation Synthesis Report 2009, *available at* <http://www.oecd.org/dataoecd/15/58/43423689.pdf>.



The examples of companies mentioned above are all recognized as industry leaders and they provide useful examples of the frontier of sustainable manufacturing. Existing manufacturers, and economic development practitioners in the Los Angeles region need to follow the lead of these industry innovators, seeking out creative solutions to catalyze and coordinate an industry-wide switch to more sustainable processes if we want to remain competitive in future markets. Finally, there already exists a plethora of resources and networks that has enabled whole sectors to make the switch to greener production processes. These market intermediaries and networks play a critical role in maintaining a regional competitive advantage in manufacturing and should be a part of any path going forward.

## TRANSFORMING THE SECTOR

While *greening the sector* focuses on strategies manufacturers can utilize to green the manufacturing process itself, *transforming the sector* looks at how existing manufacturers, working within the larger industry context, can change *what they produce* to meet a growing demand for less-toxic, sustainable products. The goal of a transformational strategy is to identify ways existing manufacturers can expand into new green markets, utilizing a manufacturing cluster's competitive advantage in order to produce new green products.<sup>49</sup>

Manufacturers must look outward to determine the likelihood of expanding into green markets and corresponding supply chains. This process involves identifying and understanding manufacturing trends in new green niche markets internationally and nationally, the organization of production and supply chains, and the demand for green products. It involves a regional cluster strategy – one that relies heavily on cooperation and sometimes legislation to spur demand for new green products that replace traditional ones. Unlike *greening the sector* efforts, *transforming the sector* relies on the economic cluster shifting course. Often city planners, government officials, and other stakeholders need to be actively involved in assessing the economic strengths of a particular regional cluster and the feasibility of its transformation.<sup>50</sup>

This section looks specifically at the demand for eco and fair trade products in apparel and furniture, and how existing Los Angeles' manufacturing clusters can transform what they produce to meet the growing demand in these sustainable markets, embedded within traditional product markets.

### *Transforming the Sector: Markets for Eco and Ethical Apparel*

The ethical fashion<sup>51</sup> movement, characterized by a final product with some combination of natural fabric, pesticide or agro-chemicals-free raw materials, non-toxic dyes, and fair labor standards, found its roots in the early 1990's when pioneering fashion designers, entrepreneurs, and consumers began to show concern about the environment and the people behind the clothes they were buying and selling.<sup>52</sup> The media played a large role in

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<sup>49</sup> *Supra* note 25, at 12-14.

<sup>50</sup> *Supra* note 25, at 13.

<sup>51</sup> The term *Ethical fashion* is used to signify the importance of people and planet in the production of apparel versus *Eco-fashion*, which tends only to encompass environmental concerns.

<sup>52</sup> See "Our Story" available at: <http://www.ethicalfashionforum.com/about-eff/our-story>.

advancing the movement by publicizing stories about sweatshop labor, exploitative conditions, and the environmental damage caused by apparel manufacturing.

The movement gained significant momentum at the beginning of the 21st century, and although the statistics are lacking by in large, the ethical consumerism reports that do exist, paint the picture of a movement that has been growing steadily since 1999 and continues to grow. In the UK for example, expenditures on ethical goods and services have grown almost threefold from 1999 to 2008, from £13.5 billion to £36 billion.<sup>53</sup> Specifically, spending on ethical fashion per household has grown from £21 in 1999 to close to £50 in 2008.<sup>54</sup> The Co-Op Bank ethical consumerism report shows that from 2005 to 2006, the market for ethical fashion increased by 30 percent to a value of £43 million, and then grew to £1.3 billion a year later.<sup>55</sup>

Although similar statistical reports for ethical fashion are missing for the United States, numerous reports in academia and the media detail the rise of the ethical consumer and the growing trend in production of ethical products in the United States. A 2009 BBMG report showed that 67 percent of Americans agree on the importance of buying products with social and environmental benefits and over half say they are willing to pay more for products with social and environmental benefits.<sup>56</sup> A growing number of apparel companies have started to adapt to this trend by offering an eco or ethical line mixed into their traditional offering to test the market. This line of thinking impacts manufacturers and requires them to re-organize production to capture the work of manufacturing ethical apparel. By adopting a triple bottom line approach—people, planet, profit—these manufacturers are setting themselves up for success in a future where this type of apparel product will become the norm.

Los Angeles's numerous apparel manufacturers already have worldwide name recognition for the styles they design and produce. This competitive advantage could be parlayed into success in the growing eco and ethical fashion markets. Making product transformation a top priority adds value in two important ways: first, as a revenue driver, through product differentiation and increased demand as consumers increasingly search out ethical clothes; and second, through intangibles which help build a brand and a loyal following and also provide a social and environmental purpose for employees.<sup>57</sup> The transformation could revitalize a sector that has lost jobs in recent years and provide a model for other apparel manufacturers across the country to follow.

### *Los Angeles Apparel Manufacturing Cluster*

Before discussing what *transforming the sector* means for Los Angeles' apparel manufacturers and presenting examples, it is necessary to first examine the structure of the Los Angeles apparel manufacturing cluster.

The Los Angeles apparel manufacturing cluster consists of manufacturers, equipment manufacturers and suppliers, software and hardware developers, fabric and notions suppliers, specialized business services, financial institutions, trade associations, educational

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<sup>53</sup> Co-Operative Bank Ethical Consumerism Report 2007, available at [http://www.co-operativebank.co.uk/images/pdf/ethical\\_consumer\\_report\\_2007.pdf](http://www.co-operativebank.co.uk/images/pdf/ethical_consumer_report_2007.pdf).

<sup>54</sup> *Id.*

<sup>55</sup> *Id.*

<sup>56</sup> See BBMG 2009 Conscious Consumer Report available at : <http://www.bbm.com>.

<sup>57</sup> Matilda Lee & Laura Sevier, *Ecologist Esthetica: A to Z of Eco Fashion* 15, (2006).



institutions, wholesalers, distributors, retailers, importers, and exporters.<sup>58</sup> These players are all considered part of the “cluster” because they are a group of functionally interconnected firms, operating in a common geographical area, linked by production and support relationships in a dominant industry.<sup>59</sup> The Los Angeles apparel manufacturing cluster plays a part in the larger production chain that makes up the apparel industry as a whole.

Specifically, Los Angeles apparel manufacturing firms can be classified as either *manufacturers* or *contractors*. The term manufacturer is usually misleading because the majority of apparel manufacturers in Los Angeles do not physically produce clothing.<sup>60</sup> Today the term represents activities that contribute to the *organizing of production*. The category of *contractor*, on the other hand, does tend to refer to producers of apparel; however, this segment is made up of small-sized firms in Los Angeles.

In the past, manufacturers in Los Angeles performed nearly all the stages of apparel manufacturing in-house. However, as firms started to diversify products, the risks associated with the ups and downs of fashion trends became expensive for the region’s manufacturers.<sup>61</sup> Outsourcing production work arose as a popular way to externalize risk, and lower the cost of labor and labor law compliance. Presently, Los Angeles’ apparel manufacturers mainly design apparel, choose fabrics, organize production, advertise, and manage distribution. Most of the production work is outsourced to small contractors locally or to large facilities internationally.<sup>62</sup>

The latest census showed about 4,500 apparel firms operating in the Los Angeles area, but did not distinguish between apparel manufacturers and contracting firms.<sup>63</sup> Apparel manufacturing employment totaled 48,000 workers in 2009, and has been in steady decline since its peak in 1996, when it employed 104,000 workers.<sup>64</sup> The latest report from the Los Angeles Economic Development Corporation predicted further decline in employment in 2010 and 2011.<sup>65</sup>

The majority of apparel manufacturing firms in Los Angeles can be classified as small to medium sized firms, with about 67 percent employing 20 workers or less, and 32 percent employing fewer than 5 workers.<sup>66</sup> Although the majority of firms are small, the majority of workers do not work in small firms. About half of the total apparel manufacturing workforce is employed at firms that employ between 20 and 100 workers.<sup>67</sup>

Despite the decline of apparel manufacturing jobs since 1996 and the continuing trend of production work being shipped overseas, L.A. apparel manufacturing firms can still maintain a competitive advantage based on the notoriety of the *L.A. Style*. Los Angeles is still perceived as a global fashion center, second in the US only to New York, and there

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<sup>58</sup> Los Angeles Regional Workforce Preparation and Economic Development Collaborative, *Fashion Forward: Assessing the Future of Apparel Manufacturing in Los Angeles County*, 5-7 (2002).

<sup>59</sup> *Id.* at 5, see also Rodino Associates, *Project to Develop Integrated Economic Development and Community Redevelopment Strategies Through Industry Clusters*, 5 (2001).

<sup>60</sup> *Supra* note 60, at 16.

<sup>61</sup> *Id.* at 18.

<sup>62</sup> *Id.* at 16.

<sup>63</sup> *Id.* at 43.

<sup>64</sup> Los Angeles Economic Development Corporation Economic Forecast and Industry Outlook: 2010-11 Mid-Year Update, 71 available at : <http://www.laedc.org>.

<sup>65</sup> *Id.*

<sup>66</sup> *Supra* note 60, at 43-44

<sup>67</sup> See table 3-4, *Supra* note 60, at 43.

continues to be a demand for things designed in and reflective of the city.<sup>68</sup> Even as L.A. loses traditional apparel manufacturing jobs to other places, its reputation as a source of fashion still remains strong.<sup>69</sup>

Existing firms need to take advantage of this worldwide name recognition to become competitive in the new eco and ethical fashion markets. By transforming the way they design, market, and organize production, Los Angeles apparel manufacturers can turn the *L.A. style* into the *eco-L.A. style* and thus become a major player in green fashion well into the future.

### *Transforming the Existing Apparel Manufacturing Sector*

Market intermediaries, consumer education, and incentives are critical in *transforming the sector* strategies. Combined, these items reduce the risk for manufacturers and lower costs associated with the shift. In London and Paris, the center of the ethical fashion movement, market intermediaries, such as the Ethical Fashion Forum and other third-party organizations (The Ethical Trading Initiative, The Responsible Purchasing Initiative, The Fairtrade Foundation, The World Fair Trade Organization, MADE BY to name a few), have strategically enabled the sector transformation and specialize in providing the resources and connections necessary for apparel manufacturers looking to take the leap into ethical fashion production. This network of intermediaries, consumer advocacy non-profits, government entities, and eco-designers are slowly expanding into the top fashion industries in New York, San Francisco, and Los Angeles, laying the groundwork for the ethical fashion market, which will make it easier for LA apparel manufacturing clusters to transform the end product.

As the apparel industry transforms, there will be an increasing need for industry and education bodies to take joint responsibility for filling in the skills gap within the workforce around the design and specialized production of sustainable apparel products. The competitiveness and productivity of a green apparel sector will not meet its fullest potential without more focused programs around sustainable fashion.

Fashion schools within the United States need to take the lead in curriculum development to embed ethical and environmental issues into a variety of courses. UK Higher Education Institutes (HEIs) already play an important role in the education of *green collar* fashion graduates, equipping them with the tools to create a more sustainable fashion industry.<sup>70</sup> Leading employers in the industry acknowledge the importance of hiring employees who possess knowledge of the social, environmental, and ethical issues involved in their businesses<sup>71</sup> and state that current graduates lack the skills needed to thrive in sustainability-focused companies.<sup>72</sup>

In order to meet these expectations, institutions must ensure that sustainability issues are at the core of every fashion subject.<sup>73</sup> Additionally, these institutions must increase their

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<sup>68</sup> LAEDC: *The Los Angeles Area Fashion Industry Profile* 2003, 8-9, available at [www.laedc.org](http://www.laedc.org).

<sup>69</sup> *Id.*

<sup>70</sup> Centre for Sustainable Fashion, London School of Fashion, *Green Collar Graduates for the Future of the Fashion Industry*, 2-3 (2009).

<sup>71</sup> *Id.*

<sup>72</sup> *Id.*

<sup>73</sup> *Id.*

engagement with business, allowing the fashion industry to inform the curriculums.<sup>74</sup> Ultimately, greater engagement will lead to graduates and employees equipped with the tools required to create a more sustainable fashion industry. *See Appendix A for a list of Educational Institutions that are recognized for their sustainable fashion programs.*

The following are examples of apparel manufacturers who embraced green, ethical fashion and have successfully transformed their product by linking to a supply chain of like-minded firms to meet the growing demand for ethical clothing. The common thread running through all these manufacturers' stories is their ability to identify sources of more sustainable inputs; to contract downstream with production facilities that use less toxic processes; to ensure a decent standard of living for workers; and lessen their manufacturing impact on the surrounding community. The key lesson for Los Angeles stakeholders is to help make competitive existing apparel manufacturers who *reorganize production* in a manner that builds local, ethical supply chains and creates jobs in the region.

### **Apolis Activism**

Apolis Activism is a small California-based, apparel brand. They specialize in classic American men's clothing, and are attempting to corner the market on high-end, socially responsible fashion. The founders, three brothers, turned a passion for social activism and charity into a successful firm that partners with textile cooperatives in the developing world, helping kick-start self-sustaining industries in those places. Apolis Activism launched a cotton initiative in Uganda in 2007, and recently launched a line of cashmere sweaters in partnership with a Nepalese woman's cooperative. Additionally, many of their products are manufactured in the United States by small-scale, local production facilities.<sup>75</sup>

Apolis Activism serves as an example of a small firm who, through the *organization of production* and raw materials, is able to provide a green, sustainable product, which at the same time improves the lives of workers at home and abroad. This is the same triple bottom line approach other small design firms in Los Angeles could follow to transform the sector into a thriving hotbed of ethical fashion. Apolis clothing is sold in 13 states as well as 3 other continents, showing a growing demand for the product.<sup>76</sup>

### **Marks & Spencer – Large Retailer Influencing the Manufacturing Supply Chain**

Marks & Spencer (M&S), a UK-based, mainstream retailer similar to Target in its product lines and reputation and with over 1,000 stores operating in 41 different, recently launched an ambitious initiative known as *Plan A*.<sup>77</sup> The stated goal of the initiative is to turn M&S into the "most sustainable major retailer in the world by 2015".<sup>78</sup>

One part of their effort has focused on the clothing they manufacture and sell. Specifically, M&S has demonstrated a commitment to the use of fair trade cotton, which helps to guarantee small-scale cotton farmers in developing countries a fair and stable price for their goods as well as a Fairtrade Premium for investment in community development projects.<sup>79</sup> Additionally, M&S has received praise for their Ethical Model Factories initiative in places

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<sup>74</sup> *Id.*

<sup>75</sup> Information from Apolis Activism Online, <http://www.apolisactivism.com>, *see also* Monocle, Issue 21 volume 3, 141 (March 2009).

<sup>76</sup> *See* locations, *available at* <http://www.apolisactivism.com/retailers/>.

<sup>77</sup> Information about "Plan A" *available at* <http://plana.marksandspencer.com/>.

<sup>78</sup> Marks & Spencer Press Release, March 1, 2010, *available at* [http://corporate.marksandspencer.com/media/press\\_releases/company/SustainableRetailer](http://corporate.marksandspencer.com/media/press_releases/company/SustainableRetailer).

<sup>79</sup> *Id.*

such as Bangladesh, India, and Africa.<sup>80</sup> These factories were set up to demonstrate best practices for compliance with international labor standards, providing solutions that give the workforce equal rights, better pay, and working conditions.<sup>81</sup> Through investment in their facilities in Bangladesh, they have seen dramatic increases in complaint resolution, and significantly cut down on absenteeism.<sup>82</sup> What is more, these facilities also saw a dramatic increase in productivity and efficiency, leading to salary increases of between 8-42 percent in three factories.<sup>83</sup>

It appears M&S has also reaped early rewards for their sustainable initiatives, with a surge in clothing sales in the first quarter of 2010. A strong performance in the sale of general merchandise—clothing and footwear specifically—has led to a 3.6 percent rise in UK sales.<sup>84</sup> M&S serves as an example of a large retailer, who through the launch of a green initiative focusing on eco-friendly fashion and other products, impacted communities around the world while still boosting sales by meeting the growing demand for sustainable products.

### **Lalasso/SOKO - Global Supply Chain Partnerships**

SOKO is a production plant located in Kenya, and was started as a non-profit looking to provide a sustainable, ethical production facility for apparel manufacturers.<sup>85</sup> The plant adheres to strict environmental principles, operating almost entirely from solar power and using rainwater to supply its water needs.<sup>86</sup> Additionally, the facility complies with major international labor standards, paying all its workers the recognized international living wage, capping maximum hours per week at 40, and providing a variety of services on site for working mothers.<sup>87</sup> The main mission of the organization is to produce quality, ethical apparel and improve the lives of the workers as well as the surrounding community. Thirty percent of profits are reinvested in the facility and the other seventy percent is donated towards local projects aimed at improving quality of life and providing social services to the community.<sup>88</sup>

Lalasso, an international fashion house known for its ethical summer collections, has agreed to source 100 percent of its production from the SOKO manufacturing facility.<sup>89</sup> Other international apparel designers are also shifting production through this type of fair trade partnership in order to differentiate their product, and despite paying more money for the production. The brand cache created from this type of partnership is immense, and could parallel a *locally made* campaign, which would be novel in Los Angeles and could boost similar social benefits for the city.

### **Emerging Los Angeles Players**

Lumi Co. is a printing technology startup out of Los Angeles. Its founders, Jesse Genet and Stephan Angoulvant, have developed a completely innovative textile printing process that

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<sup>80</sup> See <http://plana.marksandspencer.com/we-are-doing/fair-partner/progress>.

<sup>81</sup> *Id.*

<sup>82</sup> Just-Style.com, *M&S Rolls Out Ethical Fashion Initiative*, June 2010, [http://www.just-style.com/news/ms-to-roll-out-ethical-factories-initiative\\_id108353.aspx](http://www.just-style.com/news/ms-to-roll-out-ethical-factories-initiative_id108353.aspx).

<sup>83</sup> *Id.*

<sup>84</sup> Guardian.co.uk, *Marks & Spencer Reports 3.6% Rise in First Quarter Sales but Warns of Tough Times Ahead*, July 7 2010, <http://www.guardian.co.uk/business/2010/jul/07/marks-spencer-sales-marc-bolland>.

<sup>85</sup> See *Proposal for SOKO: An Ethical Factory Development in Ukunda, Kenya*, (2008).

<sup>86</sup> *Id.* at 7-8

<sup>87</sup> *Id.*

<sup>88</sup> *Id.*

<sup>89</sup> *Id.* at 8-9.

creates vivid, photo-realistic imagery on all natural materials.<sup>90</sup> The company is a good fit for apparel manufacturers and fashion labels looking to incorporate a new, local, eco-friendly printing process into their chain of production. The printing dyes are nontoxic and natural, as in no chemicals are used, and it produces photo quality prints on all natural materials—both are benefits traditional screen printing companies cannot add to the final product.<sup>91</sup>

Del Forte denim is on the forefront of sustainable denim fashions. Based out of Berkeley, CA, the denim line gained popularity after showcasing in the first-ever ethical fashion floor at London Fashion Week four years ago. The company uses 100 percent organic cotton and has partnered with The Sustainable Cotton Project, which builds bridges between farmers, manufacturers, and consumers to promote certified-organic cotton since 1994. The final products are sewn and finished in Los Angeles factories that are promoted as sweat-shop free facilities.<sup>92</sup>

Linda Loudermilk represents one of L.A.'s most well-respected ethical fashion designers. She has produced runway shows in Paris and London and commands a high price for her ethical apparel in boutiques around the world. She produces all her apparel locally. In an effort to build the sector, she is also spearheading a new sustainable fashion label called Luxury Eco geared to the top echelon of green companies.<sup>93</sup>

L.E.A.F., short for Labeling Ecologically Approved Fabrics, is a new eco-labeling program aimed at eliminating confusion in the U.S. market around environmental and social labeling for apparel and textile products. The company looks to clearly communicate to consumers which third-party certifications apparel products have received, and where along the supply chain these certifications apply.<sup>94</sup> Using specific environmental and social achievement categories, the information will be communicated through a licensed eco-mark and labeling format designed to be easily identified and read by U.S. consumers.<sup>95</sup> The goal is to become a high profile program similar to the USDA food rating system and the LEED environmental rating system used for green buildings.<sup>96</sup> If the label catches on, apparel manufacturers in the United States would have a new way to communicate the eco-friendly and ethical nature of their product to consumers looking for sustainable products.

The previous examples of large and small apparel manufacturers, production facilities, and other key players provide a useful snapshot of market trends in eco/ethical fashion. Los Angeles' large apparel manufacturing sector is the largest in the United States, but still needs to change into more green production to stay relevant in green apparel manufacturing world. Thankfully, a network of consultants, suppliers, contractors, and manufacturers already exists and is growing by the day, making it easier and easier for a company to produce green products in this sector.

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<sup>90</sup> *Lumi Co.—A new Printing Technology*, available at: <http://www.kickstarter.com/projects/lumi/lumi-co-a-new-textile-printing-technology>.

<sup>91</sup> *Id.*

<sup>92</sup> See [http://www.thegreenloop.com/Del\\_Forte\\_Denim\\_s/33.htm](http://www.thegreenloop.com/Del_Forte_Denim_s/33.htm)

<sup>93</sup> See <http://www.lindaloudermilk.com>

<sup>94</sup> *L.E.A.F.—About Us*, <http://www.leafcertified.org/about/index.html>.

<sup>95</sup> *Id.*

<sup>96</sup> *Id.*

## *Transforming the Sector: Markets for Sustainable Furniture*

The demand for green furniture for homes and offices has been driven by a variety of city, state, and national legislation aimed at reducing greenhouse gas emissions. Purchasing eco-friendly furniture is one of the many strategies companies and commercial property owners can use to reduce emissions. Desks, chairs, and shelves also negatively impact the environment beyond using energy and natural resources for production. They are sources of toxic chemicals from both their manufacturing process and after their disposal.<sup>97</sup> What is more, many sealants, adhesives, and finishes used can have a negative effect on indoor air quality.<sup>98</sup> Furnishings that incorporate recycled materials, FSC-certified veneers, water-based adhesives, VOC-free sealants, and other eco-friendly finishes can significantly reduce harmful pollutants that are released into the air.<sup>99</sup> Due to this growing awareness, demand for green furnishings in commercial buildings is increasing.

Another force driving demand for green furniture is the individual consumer, specifically the Lifestyles of Health and Sustainability (LOHAS) customer segment, looking to reduce toxicity and be environmentally-friendly in his or her home. The same conscious consumer who is buying green apparel also tends to extend eco-conscientiousness to furniture purchases, and tries to ensure that furniture bought has as little impact on the environment as possible. Manufacturers have tapped into this market by sourcing more sustainable raw materials, experimenting with new prototypes, and implementing more sustainable production processes.

There are many eco-issues surrounding the furniture manufacturing industry including energy-use issues, pollution and toxic chemicals, and sustainability of resources. Firms looking to transform and produce green end products focus on the sustainability of materials, the toxicity of sealants and adhesives that are used in a particular finished product, and find new eco-designer customers. In the case of products made primarily from wood, for instance, a manufacturer looks for recycled or sustainably harvested sources. These manufacturers can look for raw materials specifically certified by organizations such as the Forest Stewardship Council, whose certification ensures that forests are being managed in such a way that growth outpaces the harvesting of trees.<sup>100</sup> Other similar certifying organizations include The American Tree Farm System, The Smartwood Program, The Southern Forests Network, and The Sustainable Forest Initiative.<sup>101</sup> In addition to certifying organizations, other entities, such as the Sustainable Furnishings Council, serve as a valuable resource for manufacturers looking for raw materials by connecting them with suppliers, and providing consulting services in green furniture production.<sup>102</sup>

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<sup>97</sup> *Green Tips: Eco-Friendly Office Furniture*, <http://gigaom.com/collaboration/green-tips-eco-friendly-office-furniture/>.

<sup>98</sup> See EPA Publication 909-F-07-001, Indoor Air Quality: Materials Section, *available at* [http://www.premierinc.com/safety/green-link/green-corner/EPA\\_IAQ\\_GreenCorner.pdf](http://www.premierinc.com/safety/green-link/green-corner/EPA_IAQ_GreenCorner.pdf).

<sup>99</sup> See Scottsdale Green Building Program: Building Materials, *available at* <http://www.scottsdaleaz.gov/Assets/Public+Website/greenbuilding/GBMaterials.pdf>.

<sup>100</sup> See The Forest Stewardship Council: About Us, [http://www.fscus.org/about\\_us/](http://www.fscus.org/about_us/).

<sup>101</sup> For links to these organizations and others see Sustainable Furnishing Council's Resource Library, *available at* <http://www.sustainablefurnishings.org/content/resource-list/18>.

<sup>102</sup> *Supra* note 100.

## *Los Angeles Furniture Manufacturing Cluster*

Los Angeles has a wide range of furniture designers and manufacturers, supplying a worldwide market of residential and commercial developers, hospitality, and healthcare industries.<sup>103</sup> The industry employs more than 39,000 workers in the L.A. County area according to a 2007 LAEDC report.<sup>104</sup> The sector has experienced a steady decline in manufacturing employment from its peak period in the early nineties and has seen a loss of about 28,000 manufacturing jobs since 2000.<sup>105</sup> Despite these losses, Los Angeles remains a major worldwide name in design and development for the industry. Additionally, there is reason to be cautiously optimistic about future growth of the furniture manufacturing industry as the population continues to grow in California and new environmental legislation could lead to increased demand for greener, less toxic furniture.<sup>106</sup>

### *Examples of Sustainable Furniture Products and Manufacturers*

Some notable furniture manufacturers, including some located in Los Angeles, have already shifted into the production of greener, more sustainable products. Cisco Brothers, a full-service manufacturer based out of South Los Angeles, has demonstrated a commitment to using only sustainable, natural, raw materials to produce its green furniture products. The company only uses forest-certified woods, and is working to elimination of many petroleum-based products in the production process. For example, Cisco Brothers has turned to cushions that incorporate natural latex, down, feathers, and soy-based foams, instead of older synthetic materials.

Turning House Furniture, a Virginia company, is leading the way in the production of wood furniture from recycled sources. The company uses wood found in flooring and support beams of abandoned industrial buildings in their products. Turning House boasts that its “deconstruction process makes it possible to recycle 98 percent of each structure that is used as a source for wood.”

For furniture manufacturing companies looking for more sustainable sources, e2e, out of Ithaca, New York, specializes in the production of petroleum-free, biodegradable composite materials that can be customized for a particular manufacturer’s needs. Their composite products are made from renewable resources including soy proteins and other natural fibers, and have the exact same weight and strength characteristics as many more hazardous composite materials already on the market. The company boasts that its product is stronger, lighter and cheaper than the composites filling landfills today.

Many other companies have attempted to capitalize on the green building trend in many cities, and position themselves as the main suppliers of sustainable furniture for green construction projects and remodels. For example, HAPcontrol, based out of Syracuse, New York, used a grant from the city’s Center of Excellence in Environmental and Energy Systems, to develop a type of bio-furniture that does not release harmful gases and thus improves indoor air quality.

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<sup>103</sup> LAEDC, *Furniture and Home Furnishings Report 2004*, available at [http://www.laedc.org/reports/roadmaps/Furniture\\_and\\_Home\\_Furnishings.pdf](http://www.laedc.org/reports/roadmaps/Furniture_and_Home_Furnishings.pdf).

<sup>104</sup> LAEDC, *Manufacturing in Southern California Report 2007*, 5, table 5, available at <http://www.laedc.org/reports/Mfg-2007.pdf>.

<sup>105</sup> *Id.*

<sup>106</sup> *Supra* note 106.



Although the companies that have transformed into green furniture manufacturers are too numerous to list—a Google search for “green” or “eco” furniture shows hundreds of companies—there is still room in the industry for many Los Angeles furniture manufacturers to shift their production. Consumers are demanding greener furniture in their homes, looking to reduce their carbon footprints, and new green construction and retrofitting projects will require suppliers of eco-friendly furniture in order to improve the sustainability of their projects. Los Angeles has an opportunity and a market to transform one of its strongest manufacturing sectors into the production of a green end product, ensuring its viability well into the future.

### *City Governments Spurring Eco-Products: Syracuse, New York*

City governments and public officials have an important role to play in helping spur industry innovation in the area of green products. By implementing comprehensive economic development strategies, cities can serve as a catalyst for revitalizing old industrial sectors into new, thriving sectors that produce green products. In Syracuse, New York, elected officials and city planners focused specifically on developing a new green manufacturing sector in their city. Using an already strong economic base, along with higher education institutions, and a number of companies in the area that could serve as suppliers to green building and retrofitting industries, the city has set its sights on helping old companies transform themselves into an integrated, 21st-century industry focused on indoor environmental quality.<sup>107</sup>

Starting in 1996, the Metropolitan Development Association of Syracuse and Central New York identified indoor environmental quality as one of seven sectors on which to focus its efforts because of the potential for good job opportunities in the sector.<sup>108</sup> The MDA looked to state government programs to stimulate the growth they were looking for in indoor air quality industries. First, they obtained a \$15.9 million grant from the state’s Strategically Targeted Academic Research program, which was used to purchase equipment or renovate laboratories conducting research in indoor environmental quality.<sup>109</sup> Next, in 2002, the MDA received money from the Centers of Excellence, a statewide network of centers created to stimulate economic development in declining upstate regions by supporting research in emerging technologies.<sup>110</sup> The centers facilitate joint industry-university research, technology transfer, and commercialization of products in defined sectors.<sup>111</sup> The developing STAR research program received an additional \$22 million from the federal Environmental Protection Agency, and changed its name to the Center of Excellence in Environmental Systems.<sup>112</sup> The center expanded its focus to include energy systems and became the Center of Excellence in Environmental and Energy Systems (Syracuse CoE).<sup>113</sup> The center has become the top facility in the country for research on indoor environmental air quality and is second in the world to Denmark’s research facilities.<sup>114</sup>

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<sup>107</sup> *Supra* note 25, at 99.

<sup>108</sup> Average annual earnings in the sector locally are about \$54,000 and usually include benefits. *Id.*

<sup>109</sup> *Supra* note 25, at 99.

<sup>110</sup> *Id.*

<sup>111</sup> *Id.*

<sup>112</sup> *Id.*

<sup>113</sup> *Id.*

<sup>114</sup> FITZGERALD, EMERALD CITIES: URBAN SUSTAINABILITY AND ECONOMIC DEVELOPMENT, 99 (2010).



The center, which started with high levels of state government support, now has the support of key businesses in the area.<sup>115</sup> Several large companies serve as the cornerstones of the CoE, such as Carrier Corporation, which employs about 1,600 in research and development locally.<sup>116</sup>

Besides research support, the CoE has also focused on catalyzing start-up companies and attracting others to the area in an attempt to stem the tide of manufacturing job loss in the area since 2000. The Syracuse CoE has made grants to several start-up companies in the region for product research and development. Companies such as HAPcontrol (discussed above), PhytoFilter Technologies, Isolation systems, and e2e Materials have all benefitted from these grants and are on the cutting edge of indoor air quality technology.<sup>117</sup>

While these start-ups all offer encouragement to a city looking to implement a similar economic development program, to truly build a cluster, a city has to attract bigger players. To that end, the MDA in Syracuse identified 304 U.S. and international companies with potential interest in locating in the area.<sup>118</sup> Without the research center, a well-trained workforce, and local start-ups, Syracuse would never have been on the radar of these larger companies. Additionally, the MDA and CoE have increased Syracuse's visibility in green sectors by hosting and attending national and international trade shows and conventions for clean tech industries.<sup>119</sup>

While the Syracuse story is a good example of how a city has implemented a focused economic development strategy around a green industrial sector, comprised of manufacturers in the traditional furniture industry, and had some measure of success, the city's model is lacking one key ingredient—effective climate change policies to support the economic development strategies. The city failed to pass a green building ordinance until September of 2007, requiring only LEED silver certification for major renovations or new construction of public buildings.<sup>120</sup> If the city had passed tougher environmental legislation earlier, the demand for indoor quality products would have driven even more innovation and development in the industry cluster.

Los Angeles can learn from this experience when looking at their economic development policies. Economic development strategies can be moderately successful when local officials and planners are willing to invest in research and development in the targeted sectors. However, in order to really grow the industry cluster, the city's economic development efforts need to be paired closely with strategic environmental policies aimed at not only reducing pollution but also driving demand for the developing cluster.

## RECOMMENDATIONS

Several different stakeholders, including government officials, planners, academia, retailers, and community organizations, have a role to play in creating a robust, green urban

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<sup>115</sup> *Id.* The Syracuse CoE describes itself as a federation with more than 140 institutional and business members.

<sup>116</sup> *Supra* note 117, at 100.

<sup>117</sup> *Id.*

<sup>118</sup> *Supra* note 117, at 101

<sup>119</sup> *Id.*

<sup>120</sup> FITZGERALD, EMERALD CITIES: URBAN SUSTAINABILITY AND ECONOMIC DEVELOPMENT, 102 (2010).

manufacturing sector in Los Angeles. The following is a list of recommendations gleaned from case studies presented in this brief and from Causemopolis' network of practitioners.

- 1) *Shape and accelerate sustainable markets in traditional sectors where Los Angeles already enjoys a competitive advantage.*
  - Regularly showcase and facilitate networking between local, sustainable industry players through green product trade shows and expos.
  - Organize *buy local* campaigns to influence and re-organize supply chains to favor local manufacturers.
  - Increase demand for sustainable versions of products already produced in Los Angeles through sustainable, local purchasing policy incentives for government and small business.
- 2) *Foster cooptition through public investment that encourages existing firms within the same industry and across a supply chain to work together to implement sector-wide sustainability strategies.*
  - Gather leaders of companies to set industry-wide goals for sustainable, competitive growth (similar to the Northwest Food Processing Association Energy Roadmap).
- 3) *Establish market intermediaries that can effectively coordinate supply and demand in nascent green product markets and for closed-loop manufacturing outcomes. This role would include coordinating the supply of a trained workforce.*
  - Increase communication between local sustainable manufacturers and community colleges, trade techs, and universities. Work with third party organizations to tailor curriculum for educating students in the core competencies of sustainability as it applies to specific industries.
  - Connect manufacturers with data and information on sustainable sources of raw materials, certifying organizations, and green-focused trade associations.
- 4) *Institute "blended value policy making" where all legislation and implementation includes social, economic, and environmental outcomes for the region.*
  - Encourage local government and economic development practitioners to integrate sustainability and the greening of industry into traditional economic development plans. Public sector investment and incentives should flow out of rigorous market analysis as to which manufacturing sectors have the greatest potential to grow as a result of implementing sustainable production processes or tapping core competencies to create new green end products.
  - Ensure that all environmental policies translate into increased demand for locally produced green products.

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## APPENDIX A

### *Examples of Closed-Loop Manufacturing: Xerox, Dupont, BASF*

Xerox, Dupont, and BASF have all employed “closed-loop manufacturing” concepts to reduce and eliminate waste altogether. The central principle of closed-loop manufacturing is “waste equals food.”<sup>121</sup> In other words, every output of manufacturing should either be returned to the ecosystem through composting or recycled for further production.<sup>122</sup> Xerox has implemented an Asset Recycle Management Program, which uses leased Xerox copiers as sources of high-quality, low-cost parts and components for new machines.<sup>123</sup> The company has developed an infrastructure for taking back leased copiers and combines it with a remanufacturing process that allows parts and components to be reconditioned, tested, and then reassembled into new machines.<sup>124</sup> The immediate result was savings in raw materials, labor, and waste disposal of about \$300-\$400 million in 1995 alone.<sup>125</sup> Additionally, the company estimates its bottom line has increased by \$700 million from remanufacturing, and it expects to save another \$1 billion by remanufacturing a new, entirely reusable or recyclable line of “green” photocopiers.<sup>126</sup>

Dupont, has implemented a similar recycling process in which it buys polyester industrial film back from customers after they use it and recycles it into new film.<sup>127</sup> Finally, BASF has used the concept of collocation (similar to vertical integration) to reduce and recycle waste from their chemical production processes.<sup>128</sup> The company designs and builds production facilities in China, India, Indonesia, and Malaysia that are in close proximity to each other, allowing the facilities to transfer waste easily from one facility for use as raw material at another. These “industrial ecosystems” solve a common problem that exists in the West, where recycling waste is often infeasible because transporting it from one site to another is dangerous and costly.<sup>129</sup>

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<sup>121</sup> Amory B. Lovins, L. Hunter Lovins & Paul Hawken, *A Road Map for Natural Capitalism from THE HARVARD BUSINESS REVIEW ON GREEN BUSINESS STRATEGY*, 81 (2007).

<sup>122</sup> *Id.*

<sup>123</sup> Stuart L. Hart, *Beyond Greening: Strategies for a Sustainable World from THE HARVARD BUSINESS REVIEW ON GREEN BUSINESS STRATEGY*, 112-13 (2007).

<sup>124</sup> *Id.*

<sup>125</sup> *Id.*

<sup>126</sup> *Supra* note 124, at 82.

<sup>127</sup> *Id.* at 83.

<sup>128</sup> *Supra* note 126, at 111.

<sup>129</sup> *Supra* note 126, at 111-12.

## APPENDIX B

### *Examples of Educational Institutions with Ethical Fashion Focus*

California College of the Arts

San Francisco Academy of Art University

University of Delaware

London College of Fashion—Center for Sustainable Fashion

Parsons School of Design

University College of the Creative Arts

## APPENDIX C

### *List of Ethical Fashion Market Intermediaries and Third-Party Organizations*

Better Cotton Initiative  
Clean Clothes Campaign  
ECOCERT  
Ethical Trading Initiative  
Fair Labor Association  
Fair Trade Federation  
Fair Trade Resource Network  
Fair Wear Foundation  
Fashioning an Ethical Industry  
Fashion Fights Poverty  
Freedom and Fashion  
Green America  
Helvetas  
International Labor Rights Forum  
Labour Behind the Label  
Made By  
National Cotton Council  
Organic Exchange  
Shop for Change  
Sustainable Style Foundation  
Sustainable Cotton Project  
SweatFree Communities  
Textiles Environmental Design  
United Students Against Sweatshops  
War on Want  
World of Good Development Organization  
Wrap