

A photograph of the Austin skyline, featuring several prominent skyscrapers and a bridge over a body of water. The scene is reflected in the calm water in the foreground. The sky is blue with scattered white clouds. The image is framed by a white vertical banner on the right side.

2016

TARGET MARKET
ASSESSMENT

ECONOMIC
DEVELOPMENT
DEPARTMENT



BENCHMARKING LOCAL INDUSTRIES' ASSETS, OPPORTUNITIES, AND OCCUPATIONS TO BETTER ADDRESS THE NEEDS OF MIDDLE-SKILL, UNDERUTILIZED, AND UNDERSERVED POPULATIONS.

Global Business Recruitment and Expansion Vision Statement:

Everything we do is to provide access to opportunity for Austinites to achieve new levels of success or a higher quality of life while being in our City. We provide these opportunities by acting as connectors that are focused on the growth of a competitive and resilient economy. Our division serves as the liaison between business and government; securing jobs, investment, and tax revenues in our city, while positioning Austin's industry, assets, human capital and reputation in a global economy.

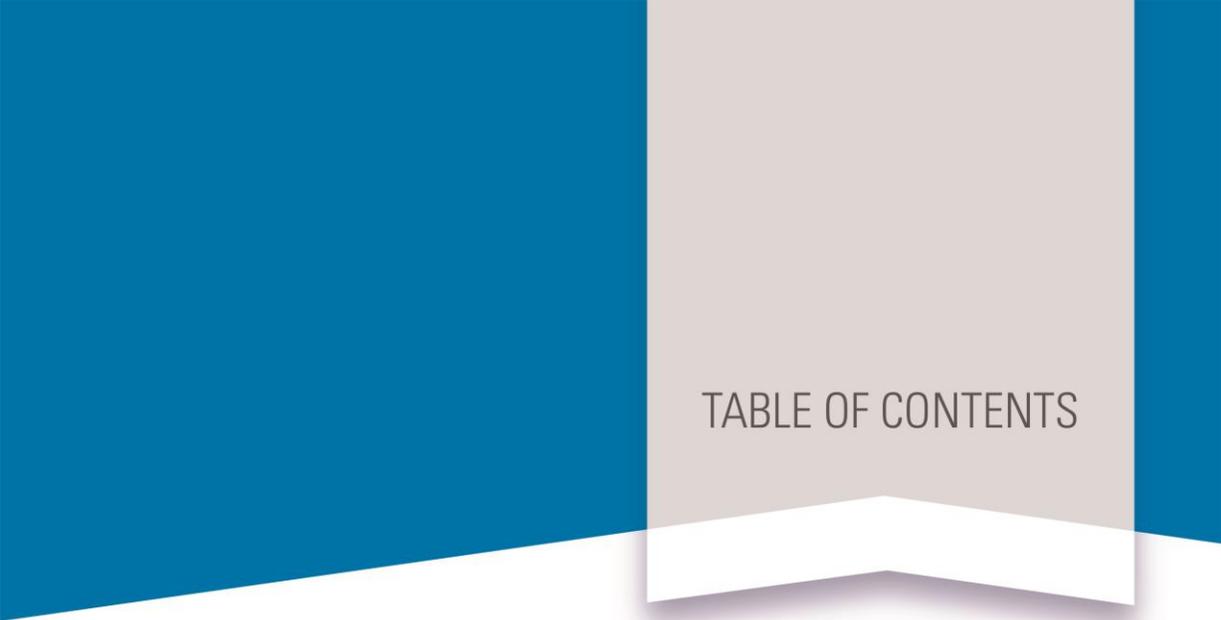


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EXECUTIVE SUMMARY

On the heels of the dot.com bust, Austin, TX established itself as an economic engine and one of the fastest growing cities as a result of diversifying the city’s portfolio of industry sectors. The city’s accolade of “last-in-first-out of the Great Recession” affirmed the importance of a strategy that emphasizes an adaptable and resilient economy against external shocks, the natural life-cycle of industry, and secular changes to the landscape of the marketplace. And while the city is touted for its robust social capital and prosperous economic development, not all stakeholders are realizing the benefits. Austin’s recognition as a “technopolis,” “knowledge-economy,” and “creative economy” hasn’t come without growing pains, as various groups grapple with a digital divide and retaining livability.

As the City of Austin greets a new paradigm in local government and community growth, the Economic Development Department (EDD) is stepping forward with a new strategic plan that has a strong focus on creating opportunities for a growing economically disadvantaged population; furthermore, the very nature of selecting Target Markets benchmarks the inputs necessary for building a sustainable marketplace, which allows the Department to make prudent and agile decisions when faced with seemingly attractive business development opportunities. To that effect, the EDD has narrowed seven Target Markets to strategically position the city for equitable economic development that will secure jobs and investment for *all* stakeholders while supporting a diverse business climate.

Target Markets



First and foremost, nurturing the Target Markets will naturally enable Austin’s abundant creative and cognitive labor force. As these individuals innovate within their respective industry, they will drive a greater uptake of an existing labor force with a comparative advantage in tactile skills and the direct creation of tangible end-products. Ultimately, EDD will encourage a symbiotic ecosystem of occupations by closing the loop on idea generation and end-product creation. Next, existing and forthcoming opportunities in these sectors are primed to be leveraged for investment, which will increase efficiencies for the City and its stakeholders. Finally, promoting the selected Target Markets will diversify Austin’s major employment sectors while hedging the City against external disruptions.

One of the City’s strongest tools for fostering the highlighted industries is the Chapter 380 program, which allows local government to attract firms and projects that generate numerous benefits for the municipality; specifically, the program is used to diversify the economy, reduce unemployment, and expand commerce. The City of Austin strategically uses Chapter 380 programs to recruit companies that generate a significant benefit to the City while aligning with Austin’s core values.

The City recognizes the importance of supporting localized and/or smaller business, and staff recommends other financing mechanisms to serve that purpose. To that effect, utilizing niche programs such as the Creative Content Incentive Program tapping external funding for the creation of industry incubators, and utilizing Economic Development Corporations may be more appropriate to facilitate indigenous economic growth within the parameters of the Target Markets.

OVERVIEW

Regions and communities strive to support a broad array of industry and commerce, as diversification provides a safeguard against the natural life-cycle of industry clusters; secular changes that alter the landscape of the marketplace; and sudden, disruptive events that render an industry obsolete. Austin's economy in the past two decades serves as a case example: After the collapse of the dot.com bubble in 2001, Austin's economic development strategy strongly focused on industry diversification, bringing high-skilled manufacturing operations to the region as well as company headquarters and businesses that could accommodate a large and growing creative sector. The resiliency of Austin's economy was tested in the most recent downturn, known as the Great Recession, and for its efforts in industry diversification, the region was one of the "last-in and first-out" of the national and international crisis.

The City seeks to continue this effort by leveraging local resources to steer development toward *win/win* results that benefit the general public as well as specifically-targeted firms or industries.¹ As stated best in the Market Street report that supported the target industries of Opportunity Austin 2.0:

Pursuit of target industries and development of clusters that form around burgeoning concentrations of jobs, talent, infrastructure, and innovation are grounded in the inexact science of optimizing local competitiveness. The right mix of talent, technology, quality of life and other dynamics that makes or breaks a region's long-term success is a hard-to-quantify critical mass of qualities that companies seek when looking to expand or relocate.²

As the country's 11th largest city, economic data suggests Austin is positioned to leverage its strong educational base and talented workforce for further growth. According to the U.S. Conference of Mayors, Austin is poised to be the fastest growing large U.S. metro economy through 2020.³ But as we take pause to reflect on these accolades and measurements of success, we must be mindful of the areas of Austin that have lagged in benefiting from our economic prosperity. According to a report from the Martin Prosperity Institute, which outlines economic segregation across the country through looking at income, educational, and occupational segregation as well as social and demographic factors, Austin ranks first for the highest segregation level among the largest metro areas in the U.S.⁴ Affordability is an additional concern: Information from a Real Estate Council of Austin memo regarding affordability in Austin points to the average rent in the Austin area increasing 50 percent from 2004 to 2013 while median incomes rose by only 9 percent.⁵

As the City of Austin greets a new paradigm in local government and community growth, the Economic Development Department (EDD) is stepping forward with a new strategic plan that has a strong focus on creating opportunities for a growing economically disadvantaged population. To that effect, the EDD has narrowed seven Target Markets to strategically position the city for equitable economic development that will secure jobs and investment for *all* stakeholders while supporting a diverse business climate.⁶

Target Markets

Industry Cluster	Description
 Advanced Manufacturing and Distribution & Logistics	Advanced Manufacturing and Distribution & Logistics firms conduct large amounts of R&D, employ a disproportionate share of STEM workers, and engage all arrangements in the intermodal supply chain and modern production system.
 Creative Sector	The Creative Sector is defined by six broad categories of activity: music, film and visual media, gaming and digital media, not-for-profit arts groups, visual arts, and culture-related tourism.
 Fashion	The Fashion Industry encompasses design, manufacturing, distribution, and sale of diverse products including wearable technology, unique designer couture and mass-produced commodities.
 Food Sector	The Food Sector is comprised of agriculture, culinary arts, food-related production, manufacturing & distribution, local food vendors, eating & drinking places, and food waste.
 Life Sciences & Technology Integration	Life Sciences & Technology Integration consists of pharmaceutical and biotech development, medical device, healthcare, and healthcare information technology.
 Mobility Innovations: Automotive & Aerospace	Mobility Innovations leverage assets and anchor firms in the automotive and aerospace sectors that develop and manufacture technology in satellites, launch providers, spacecraft components, in-space services, robotics, electrical power systems, renewable fuels, and engine control systems.
 Zero Waste	Zero Waste is defined by a set of technologies and services developed across a number of industries in response to concerns about climate change, energy security, resource depletion, recycling, remanufacturing, and reducing dependence on raw material.

The commitment to utilizing robust segments of the labor force across an array of industry highlights EDD’s intentions of promoting sustainable growth. Establishing a broad set of target markets will protect the City from external shocks to a given industry or external market factors. Hedging the City’s commitment to any one industry minimizes risk from market volatility; and, the benefits of such a practice can be observed in Austin’s resiliency in the Great Recession relative to other communities that had more industry concentration, and therefore more vulnerability. Also when analyzed on the basis of singularity, many projects may project an attractive return on investment. But as the old adage goes, “the whole is greater than the sum of its parts,” and this hold true when developing a diversified business community. Reflecting on the established Target Markets and associated goals will make EDD more agile in its decision making when faced with a plethora of project-based opportunities, especially as Austin remains atop lists for business friendliness and livability.

This report will outline the general state of each Target Market, especially as it pertains to Austin. The analysis goes on to identify opportunities across all segments of the labor force within each respective industry; and, a sample of both cognitive and non-cognitive occupations and associated wages will be outlined. Finally, regional assets that may be leveraged are identified for each Target Market to facilitate the development of the sector. Moving forward, EDD and its partners will utilize this report to assess the value of prospective business development as it relates to Business Expansion and Relocation, the Creative Content Incentive Program, and, International Trade & Investment; furthermore, the information presented will serve as a primary resource for Austinites, Mayor & Council, and those interested in the Department’s strategic plan for cluster-based economic development.

STRATEGIC APPROACH

EDD has outlined two strategic approaches to be executed in association with the execution of the seven Target Markets. The relative focus between these strategies will naturally shift over time in response to external economic factors: Boom times like the current, for example, allow the City to focus on incorporating the last segment of the labor force into the widespread prosperity. When stakeholders are hard-pressed to find that prosperity as a result of an economic downturn, however, the City may turn its attention to overall recruitment and retention efforts to jump-start the economy. Whatever the end-goal may be (i.e. tackling unemployment, affordability, the digital divide, economic barriers, etc.), EDD seeks to operate in the context of these seven Target Markets. And though the approaches span across an extensive time horizon, each are equally weighted and are vital to the success of the other.

STRATEGIC APPROACH 1:

INCREASE JOB OPPORTUNITIES ACROSS ALL SEGMENTS OF THE LABOR FORCE

In the process of supporting these markets, EDD will encourage the development of a range of occupations within each sector. The Target Markets were selected in part because they have the potential to engage Austin's abundant cognitive labor force; and as these individuals innovate within their respective industry, they will drive greater uptake of an existing labor force in the direct creation of valuable end-products and services – thereby rounding out a symbiotic ecosystem of occupations by closing the loop on idea generation and fabrication. An example of an ideal scenario is providing a viable market for a fashion designer, who then drives the demand for sewing machine operators; or, enabling an aerospace engineer that will eventually need an electromechanical equipment assembler to build a prototype satellite.

The City faces a labor economics challenge that is prevalent across most developed markets: a hollowing-out of middle skill jobs as a result of automation and routinization. Middle-skill jobs⁷ – jobs that generally require more than a high school diploma but less than a bachelor's degree – in manufacturing and clerical occupations across the nation has decreased substantially since the mid-1980s; and the relative earnings for workers around the median of the wage distribution has dropped over the same period, leaving them with hardly any real wage gains in nearly 30 years.⁸

Nearly 124,000 Austenites, or 24% of Austin's population between aged 24 to 64 years, have 'some college or an associate's degree'; however, one in five of these individuals is unemployed or has dropped out of the labor force. In comparison, that figure stands at 15% for those with a bachelor's degree or higher.⁹ Furthermore, of all individuals that are unemployed or not in the labor force between 25 and 64 years, a quarter of them fall in this group. Data from Workforce Solutions Capital Area shows middle-skill jobs comprise nearly 20% of total jobs in the Capital Area. And though talent supply at this skill level has grown and will continue to grow, it is not projected to increase at the rate of demand for high-skill and low skill jobs. For this reason, EDD is committed to counteract these developments to slow down or even reverse the increasing reduction of quality jobs that provide career pathways to a critical segment of Austin's labor force.

While middle-skill jobs are of special attention to EDD, the broader spectrum of the labor market cannot be overlooked if the Department is to be successful at bolstering a diverse and sustainable economy. While Austin boasts an unemployment rate of 2.9%, which skirts full-employment, certain segments of the population have not participated in the broad prosperity. In order to ensure equitable growth across the city, the Department is

committed to serving those individuals that may be unaccounted for by conventional standards. This group is recognized as the **underutilized population**¹⁰, and it includes not only the unemployed, but also the marginally attached, the underemployed and discouraged workers. As of March 2016, 7,888 persons were accounted for by means of traditional unemployment estimates yet an additional 13,376 persons were working part-time for economic reasons, marginally attached to the labor force, or a discouraged worker and therefore excluded from full employment. Appendix Item 1 contains a breakdown of these definitions and figures.

While strategic cluster development focuses on the recruitment and retention of particular industries, these efforts only address the demand side of the equation. If social mobility is to gain momentum in Austin, this approach to economic development needs to be paired with a focus on the supply side of talent via vocational training, encouragement of STEM (Science, Technology, Engineering, & Math) in underrepresented youth populations, and strategic site selection of businesses.

Increased collaboration with workforce development partners and focus on projects/industries that encourage this segment of the labor force is EDD's first strategic approach to target cluster development. During economic upswings, a focus on engaging Austin's existing human capital allows the Department to alleviate economic inequities in the community while strengthening the city's competitive advantage.

STRATEGIC APPROACH 2: LEVERAGE MUNICIPAL RESOURCES TO GENERATE SHARED RETURNS WITH THE PRIVATE SECTOR

The private sector is inherently incentivized to quickly generate the largest return on its investment. For that reason, the City is encouraged to adopt a strategy that identifies industries or projects that are primed for private sector involvement. By partnering with the private sector, the City may achieve its goal quality job creation and maximizing tax roll revenue.

In the context of cluster development, EDD may choose to use an economic development tool such as Chapter 380 incentives to encourage job and commercial growth in an industry that is essential for Austin to retain its economic competitiveness. In other cases such as public-private partnerships (P3s), the City may choose to leverage an asset to attract capital investments (i.e. space parks, science parks, manufacturing hubs, incubators, redevelopment projects). With prudent and meticulous analysis, the City has the potential to create systemic benefits with the use of the private sector's resources and comparative advantage.

Examples of Public Private Partnerships in Austin



Seaholm District



Mueller Community



The Long Center



ADVANCED MANUFACTURING AND DISTRIBUTION & LOGISTICS

The Advanced Manufacturing and Distribution & Logistics are two interlaced industries that support a cluster that typically promotes a combination of wages and educational requirements that fit well with traditionally hard-to-employ segments of the labor force. Austin has had great success in developing the Advanced Manufacturing industry as evidenced by the presence of Samsung, Spansion, and Applied Materials. Although the city currently lacks strong Distribution & Logistics infrastructure in the way of rail spurs, an inland port, or intermodal hubs, Austin's comparative advantage in the space and the relatively longer time-horizon with which the Economic Development Department operates qualifies it as a critical underpinning for a modern economy and future and seeks to develop the industry.

ADVANCED MANUFACTURING

For the purpose of this report, Advanced Manufacturing is specific to convergence technologies, which cover a fast-paced segment where innovation is constantly expanding the potential product-development landscape. Convergence technologies drive telecommunications, software, media, automotive, computer, semiconductor, and related industries. According to the Opportunity Austin 2.0 Target Business Review, "Certain manufacturing sub-sectors leveraging potential convergence technology product components are clearly vulnerable to the same global forces pressuring nearly all U.S. manufacturing employment;" however, "Recent Austin-area investments suggest Greater Austin may retain its competitive position in this sub-sector, despite national trends."¹¹ To that effect, the region has a vast experience and knowledge base in IT, semiconductor, wireless, nanotechnology, and related high-tech operations that can create and support new ventures. Many of the top computer and microchip firms have established major design and production centers in Austin, spurred by a favorable business climate, Foreign Trade Zone designations, and available Freeport tax exemptions – all of which streamline site activation.



Samsung Austin Semiconductor Fabrication Plant

As of 2012, the Austin MSA was home to 306 high-tech manufacturing firms and employed 29,700 people, which is about 58.3% of the region's general manufacturing employment.¹² In 2010, the average annual wage for all manufacturing jobs in Austin was \$88,026, or 81 percent higher than the national average for the industry.¹³

Given the breadth of Advanced Manufacturing, it should come as no surprise that the industry is a key provider of living-wage, middle skill jobs in Austin that require less than a bachelor's degree. Of the top ten occupations employed by manufacturers, six require a high school diploma, an associate's degree, or a postsecondary certificate.¹⁴ Of note, the top three occupations in the industry – Electrical & Electronic Equipment Assemblers; Team Assemblers; and Electrical & Electronics Engineering Technicians – provide median hourly earnings well

above the estimated living wage of \$10.97 for the City of Austin.¹⁵ ¹⁶ Of significance is the typical entry level education needed: a high school diploma for the first two and an associate’s degree for the latter. These are relatively small barriers to entry for most individuals, and continued support of an industry that provides such opportunity is key to an equitable community.

DISTRIBUTION & LOGISTICS

According to a TXP report on Distribution & Logistics in Austin, “the evolution of information technology shifts in global production patterns and international consumer demand, and changes in business practices have all contributed to an explosion in logistics and distribution in the modern economy.” ¹⁷ The prevalence of technology in Austin’s economy may share synergies with Distribution & Logistics industries that are increasingly reliant on software-based tools. Posted job openings emphasize this point: According to Indeed, the term “logistics” yields 618 job available, which is slightly less than two-thirds of the total when grouped with the search term “distribution,” “cargo,” and “warehousing.”¹⁸ The TXP report articulates, “... there is little specific infrastructure required for this activity, [so] the opportunity for growth [in logistics] could be substantial.”¹⁹ Data from the Texas Workforce Commission validates this forecast, as the demand for logisticians is projected to grow 47% between 2012 and 2022, making it the third fastest growing occupation in the region.

AUSTIN’S DISTRIBUTION & LOGISTICS INDUSTRY

\$4.8 BILLION IN TOTAL ECONOMIC ACTIVITY

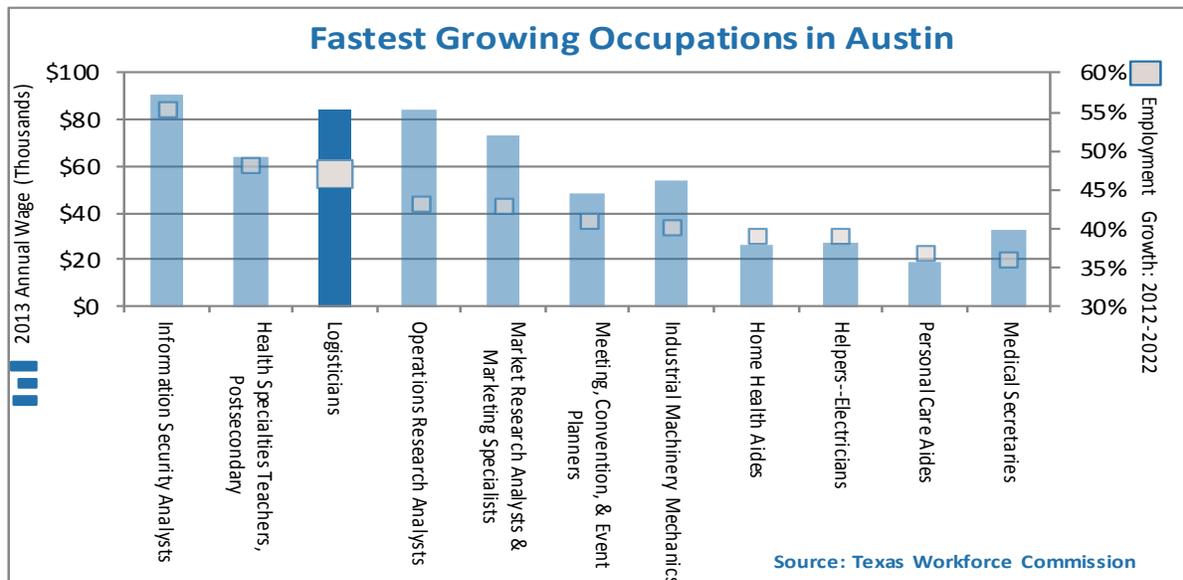
5% OF THE TOTAL AUSTIN METRO GDP

\$1.4 BILLION IN LABOR COMPENSATION

43,800 JOBS

Of the top ten occupations in the Distribution & Logistics industry, none require advanced degrees and all offer living wages above the estimated living wage for the Austin region.²⁰ Considering the typical education needed for entry into most occupations is less than high school, this industry is a prime candidate for a segment of the labor force in Austin (12.5% of individuals 25-64 years) that currently faces a true unemployment rate of 35%.²¹

The local Distribution & Logistics industry accounted for \$4.8 billion in total economic activity – or 5% of the total the Austin Metro gross domestic product (GDP) – \$1.4 billion in labor compensation, and approximately 43,800 permanent jobs in 2013. ²²



ADVANCED MANUFACTURING AND DISTRIBUTION & LOGISTICS

REGIONAL STRENGTHS	GAPS/OPPORTUNITIES
<ul style="list-style-type: none"> • The University of Texas: <ul style="list-style-type: none"> • University is strong in numerous convergence industry programs, specializations, and research centers • Center for Transportation Research • Mater of Science in science and technology commercialization • Austin Technology Incubator (IC²) • Existing industry-specific trade councils, i.e. Austin Technology Council, Austin Regional Manufacturing Association • Non-stop international flights • Freeport Exemption Zones and Foreign Trade Zones • Chapter 380 agreements • The Austin region is located on the NAFTA Corridor 	<ul style="list-style-type: none"> • Technology wages are not restrictively high, giving Austin a comparative advantage over other regions such as the Bay Area or New York • Growth in Austin is creating significant demand for Distribution and Logistics workers to move consumer goods • Niche exports, i.e. outbound foreign trade dominated by computer and electronic products to South Korea (i.e.Samsung), may generate local Distribution & Logistics opportunities • Recent growth in manufacturing, both medical and of convergence technologies (i.e. Samsung and the Dell Medical School), will increase the demand for the Manufacturing, Distribution, and Logistics firms and labor • Austin’s workforce is skilled with rapidly-evolving software-based tools and can provide support for the development of the Logistics industry • The Greater Austin Chamber of Commerce is committed to maintaining/establishing further non-stop international flights

STRATEGIC APPROACH/INITIATIVES

Strategic Approach 1:

Historically, this industry cluster has served as primary point of entry to the workforce for low-to medium-skilled workers. Upskilling is becoming a frequent necessity in the cluster due to technological proliferation. For that reason, continued commitment to working with local service providers such as Skillpoint Alliance, Workforce Solutions, and the Austin Community College is essential to providing the labor shed with the skills necessary for placement within these occupations.

Strategic Approach 2:

Distribution & Logistics commonly relies heavily on transportation infrastructure, which Central Texas lacks (i.e. water ports, intersection of several interstates, or specialized aviation capacity). However, growth of the industry can be facilitated by developing a Central Texas Intermodal Facility. According to analysis from TXP, the economic impact of an intermodal facility would generate \$767.8 million in activity, \$228 million in earnings, and 5,772 permanent jobs.²³

Chapter 380 is a useful medium in business recruitment and expansion for the Advanced Manufacturing, Transportation, and Logistics due to the nature of these projects. In deals past, companies have earned both job-based and property tax-based incentives in exchange for ties to the local economy and a commitment to onboarding significant and critical segments of the labor force. Thus, the shared investment in the community between the City and the project generate benefits for both parties.



CREATIVE SECTOR

TXP conveys it best when it states “The performance of a region’s creative sector is essential for economic growth and prosperity. Once narrowly defined as entertainment and fine arts, the creative sector is now seen in a broader and more robust context. The current definition of the sector includes a range of occupations across many industries whose common denominator is reliance on innovation as the basis of creating value.”²⁴

Austin’s long standing celebration of the arts and creativity has led to the creation of a tangible industry that plays a major role in the city’s overall economy. Spurring innovation and intellectual capital, the Austin metro area’s creative economy accounted for the highest percentage of total local employment of all metro areas in Texas (11.5%) in 2013. For the purpose of this report, staff defines the Creative Sector in the same manner as the *2012 TXP Economic Impact of the Creative Sector in Austin* report (hereafter the TXP Report):

- Music, including production, music video, industry, tour, and recording services, performers, and commercial music
- Film and visual media (including film, television, and commercial production)
- Gaming, digital media, and post production services
- Not-for-profit arts groups; and,
- Visual arts (galleries, photographers, and other commercial visual artists)

The TXP Report accurately articulated the significance of the Creative Sector in Austin’s comparative advantage for business recruitment and expansion:

Austin is a place that appreciates creativity and culture in a variety of evolving forms, which serves to both attract and retain talented people. This in turn has a significant impact on business recruitment, retention, and expansion, as well as local entrepreneurship. As has long been the case, the sum is greater than the parts; and the parts have become so interconnected as to make traditional distinctions between them almost meaningless. As Austin looks to its economic development future, creativity is a fundamental comparative advantage.

[A highly capable workforce, innovation, and entrepreneurship, clusters in knowledge industries, the presence of a world-class research university and strong community institutions] are built, at least in part, on the interrelationship between creativity, innovation, and quality of life in Austin. The connection between creativity and innovation has been explored in depth, and it is clear that much of the incremental growth of the local economy has been in sectors of the economy that rely on knowledge and creativity to generate value.²⁵



Patrons enjoy a free Spoon concert during SXSW 2015 at Auditorium Shores

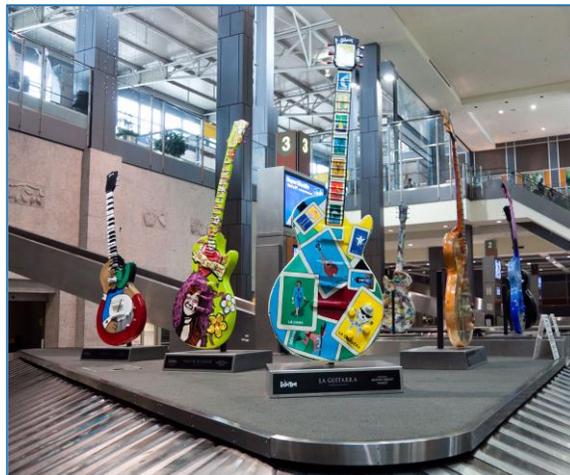
According to the TXP Report, the Creative Sector of the Austin’s economy accounted for just over \$4.35 billion in economic activity, over \$71 million in City tax revenues, and almost 49,000 permanent jobs. Among individual segments, gaming and digital media experienced the most rapid growth.²⁶ Meanwhile, the economic impact of the Creative Sector continues to be most evident in tourism, as the City continues to leverage its reputation as the “Live Music Capital of the World” and assets such as SXSW, Austin City Limits, and a viable filming location.²⁷ As highlighted in the Market Street Target Business Review, “Greater Austin has a growing reputation for its capacity related to filmmaking,” earning the attention of *MovieMaker* magazine, who praised the City’s indie-film capacity and recently quoted Austin the best place in the U.S. to live, work, and make movies (after New York).²⁸

*“The Creative Sector of Austin’s Economy accounted for just over **\$4.35 billion** in economic activity, over **\$71 million** in tax revenues, and almost **49,000** permanent jobs”*

Though frequently understated, the Creative Sector offers ample job opportunities for broader segments of the labor beyond those with a college degree. Middle skill occupations are a critical component advancing an idea from concept to creation. Across music, food, theatre, and film, populations without advanced degrees benefit from the low barriers to entry, short-term on-the-job training, and a career progression that often values years in the field over years in the classroom. However, income stagnation, a lack of affordability and an increase in the cost of living is edging out segments of this labor spectrum - particularly a broad range of artists, which include musicians, critics, publicists, theatre and set designers – which have been adversely affected by the digital era and radically lowered barriers to producing and disseminating work. If Austin is to attract and retain these individuals in our society, efforts must be made around policy support i.e. city-codified entertainment districts, land/building grants, and investment in a creative industry hub with affordable co-working space²⁹.



BMX rider at X-Games Austin



Gibson Guitartown art installation at Austin Bergstrom International Airport



Art in Public Places (AIPP) Installation on downtown sidewalk

CREATIVE SECTOR

REGIONAL STRENGTHS	GAPS/OPPORTUNITIES
<ul style="list-style-type: none"> • University of Texas: <ul style="list-style-type: none"> • Gaming curriculum • Radio/Television/Film program in Moody College of Communication • Research centers: The Center for Advanced Studies in the Arts (CASA); the Computational Visualization Center; and, the Laboratory for Image & Video Engineering (LIVE) • Gaming curriculum at Austin Community College • Digital media management MBA at St. Edward's University • State and City-level incentives for film production • Capable existing film-production workforce • Austin Film Society, which manages the 100,000 square foot Austin Studios film production facility • Austin is home to high profile events such as SXSW, ACL, Fun Fun Fun Fest, X Games, Euphoria, which offer opportunity for curating local creative talent and product 	<ul style="list-style-type: none"> • A stronger presence of the industry cluster at the local level would encourage higher enrollment in existing degree programs, thereby curating a local talent pool • The 2015 Austin Music Census, 46.7% of respondents reported a lack of opportunity of cross-industry film, video game, theatre/visual arts projects. Still, the report indicates that "...these industries have been operating in such a portioned fashion that respondents lack specific knowledge about opportunities that might exist or that could be developed³⁰ • Improved synergies between entertainment, media, and technology companies would bolster the cluster • The creation of more robust artist-and producer-development programs, a digital media, arts, and/or film incubation program/facility, and additional film, TV, and music production infrastructure would encourage the refinement of the industry

STRATEGIC APPROACH/INITIATIVES

Strategic Approach 1:

Fostering the Creative Sector talent will drive innovation beyond those businesses directly involved with the industry. As stated in the 2015 Austin Music Census, "Many cities around the world are beginning to understand that there is a distinct advantage in retaining or building an artist class as a critical means of becoming innovative, thought-leading and prosperous hubs, and are acting on those ideas."³¹ Considering Austin's oversupply of college-educated workers, expanding the number of jobs in creative industries will increase the economic mobility of this group. Subsequently, other working classes will enjoy positive spill-over effects as the demand for jobs further down the skill-ladder will increase.

Strategic Approach 2:

The City should explore sources of funding to support infrastructure and facilities, industry hubs, co-working space, loan guarantees, marketing, business development, etc. There is precedent for this orientation i.e. bond funding several years ago for Austin Studios and the music loan guarantee fund. As business models and organizational structures continue to evolve, resources that provide foundational support to the sector as a whole are likely to be efficient, especially to the extent that they can leverage additional private-sector or philanthropic funding.³²

The City's Creative Content Incentive Program is another shared investment between the public and the private that offers a performance-based grant for stimulating the Austin economy through local spending on wages, goods, and services.



THE FASHION INDUSTRY

A large force disrupting the mature fashion industry is an uptick in consumer demand for locally sourced fashion products and textiles, which is concurrent with a general trend toward artisan goods and services as a growing presence in the developed world economy.³³ The traditional business model in the fashion industry relies heavily on cheap labor and material overseas; however, the current apparel industry is straying away from the high volume, low cost methods of the past and is finding success with an artisanal approach emphasizing high quality, limited edition, and customizable pieces.³⁴

Another development shaking-up established practices in the industry is the influx of technology, which has broadened the scope of the existing value chain. Research and development, services, marketing, and design are now driven by innovative, tech-focused practices, which may include virtual-reality retail, online stylists, social media, and data-driven innovation. Smart textiles, the miniaturization of electronics, and decreasing manufacturing costs of fabrics and electronic components has stretched the conventional definition of fashion. According to a 2014 Price Waterhouse Coopers' report, *The Wearable Future*, one in five American adults already own some type of wearable device, and the wearable tech industry shipped an estimated 19 million devices in 2014.³⁵ Aiding this growth is the enhancement in wireless technology, which has assisted in communication between smart textiles and devices such as mobile phones and computers. According to Grand View Research, the global smart textiles market was valued at \$289.5 million in 2012.

According to Grand View Research, a market research and consulting firm, "the advent of wearable devices has facilitated the continual monitoring of physiological signals, which is of crucial importance in the medical or healthcare sector. By allowing the remote monitoring of patients, these textiles also help overcome the drawback of infrequent clinic visits... Growing world population and the greater longevity have resulted in need for improvement in drug delivery, administration of healthcare, surgical and other medical procedures, as well as professional interactions in patient recovery."³⁶ An economy that has a burgeoning biomedical focus such as Austin's, the development of this line of fashion proves to be a valuable resource in creating an industry ecosystem.

Parallel to the emergence of wearable tech in the medical sector is the increased acceptance of wearable devices across the health and fitness industries. According a report by Gartner, a technology research and advisory firm, shipments of health and fitness tracking wearables are forecast to reach 91.3 million by the end of 2016.³⁷ Many believe there is an incipient convergence between wearable devices and smart textiles: as popular as wearable devices are, experts posit that "technology must become deeply embedded into the clothing we already wear, starting at the level of the fibers and fabrics."³⁸ Given the announcement of clothing manufacturer Under Armour's "Connected Fitness" digital headquarters – which



Under Armour Connected Fitness Headquarters in the Seaholm District, Austin, TX



Under Armour Prototype of wearable device technology intertwined with fashion

entails various health and fitness applications, Under Armour Record, MapMyFitness, Endomondo, and MyFitnessPal – Austin is in a prime position to pull the lever on being the center of creation for the apparel-related wearable technology industry.

In 2013, Austin’s Fashion Industry generated \$86,311,629 and spurs 1,326 jobs after accounting for direct, indirect, and induced economic effects. Nine hundred sixty-three jobs were attributed to apparel manufacturing while 363 were designated as artisan fashion design.³⁹ Given that nearly three-quarters of jobs in the region are dedicated to manufacturing, it’s evident that there are current opportunities in the industry for low-to middle-skill workers. Similarly on the other side of the spectrum, full-time fashion designers in Austin make an average salary between \$30,712 and \$65,023 – well above a living wage for the region.

Despite evidence that there are no distinct fashion markets that operate full time to showcase local design, Austin’s status as a premier city for arts and music affords it the ability to carve out its place in the global market. Fostering the Fashion Industry could result in significant economic benefits for the local economy including the creation of creative and manufacturing jobs, tourism, and enhancing our local culture. As stated by TXP in its 2015 report, *The Fashion & Apparel Industries in Austin*, “creative, high value-added, and small batch have proved to be a comparative advantage for the Austin market, and there are clearly opportunities to grow the local fashion and apparel industry.”⁴⁰ To help jumpstart the local industry, policy makers may choose to consider addressing the lack of adequate production capacity in the City (in both people and equipment), access to markets, and financing.⁴¹ A fashion incubator may provide the resources necessary to cultivate a nationally competitive industry.

AUSTIN’S FASHION INDUSTRY

- **GENERATES \$86,311,629** IN ECONOMIC OUTPUT
- **EMPLOYS 1,3226** FULL TIME WORKERS IN THE LOCAL COMMUNITY
- **PROVIDES JOB OPPORTUNITIES ACROSS THE VALUE CHAIN WITH PAY THAT EXCEEDS A LIVING**



Fashion Manufacturing Cooperative prototype at the thinkEAST Living Charrette as part of the 2015 Fusebox Festival

FASHION

REGIONAL STRENGTHS	GAPS/OPPORTUNITIES
<ul style="list-style-type: none"> University of Texas-Austin, Austin Community College, St. Edwards University, Baylor University, and Texas State University provide apparel courses Development of the Medical District and presence of companies such as MapMyFitness, Inc., Atlas Wearables, Inc., and Mutual Mobile Stich Fix, Under Armour, and Kendra Scott have a local presence and may serve as anchor institutions for both innovative and traditional mediums of fashion The fashion industry has the potential to further contribute to Austin’s \$443 million arts related economic engine⁴² Austin Fashion Week (AFW), now in its seventh year, is the largest fashion event in Texas and one of the most highly acclaimed in the Southern United States⁴³ 	<ul style="list-style-type: none"> Austin has the potential to become a major fashion hub given the availability of Texas grown cotton and wool for textiles There is a potential partnership between a thriving fashion district and Austin’s film industry’s costume needs ACC and the City of Austin are in the process of developing a fashion incubator that will provide business development programs, low-cost design space, opportunities for mentoring, and space for collaboration Austin currently has limited capacity for manufacturing and production, and there could be significant opportunities for job and industry growth by enabling education of advanced apparel manufacturing in the City

STRATEGIC APPROACH/INITIATIVES

Strategic Approach 1:

Greater exposure and encouragement of Austin’s Fashion Industry may develop an ecosystem that provides occupations at both the top and bottom of the skills ladder. Moreover, support of the sector can strengthen the existing entrepreneurial and nascent foothold that currently exists in Austin. According to a local fashion industry survey distributed by TXP, Inc. that garnered 55 responses, sole-proprietorships made up 46.1 percent of responses. Businesses employing 2 to 5 workers accounted for an additional 40.4 percent of respondents. Furthermore, an overwhelming majority identified themselves as a designer. A more established market for local garments and textiles may drive an increase in the number of fashion related occupations: as product and capital moves across the value-chain, the broader segments of the labor force, such as manufacturing and production staff, may see an uptick in employment.

Strategic Approach 2:

Best practices from other leading cities highlight the value in public-private partnerships, especially in nurturing a fashion industry. Communities such as Toronto, New York, Philadelphia, Seattle, and London have developed incubator models that support both fashion designer’s enterprises and the overall industry in the region. According to TXP, “this is accomplished through some combination of access to low cost studio space, use of expensive professional equipment, professionalization, business mentoring, educational seminars, and networking opportunities. For many communities, the incubators grew out of a desire to retain the design talent native to each community and allowed the local fashion industry to organize around a central locus.”⁴⁴

The City of Austin is exploring a variety of approaches to strengthen the local Fashion Industry, including preliminary conversation with Austin Community College regarding the possibility of City support for equipment and resources



FOOD SECTOR

As farms have consolidated over the past 50 years, so has the food processing industry. This means that food is transported over vastly greater distances, and the production and processing of food is in the hands of a relatively small number of corporations.⁴⁵ National trends in the food sector point to a polarizing reaction, as communities display an increasing demand for locally grown and processed food. According to a United States Department of Agriculture report, Farm operations with direct-to-consumer (DTC) sales for human food consumption increased from 116,733 to 144,530 between 2002 and 2012. Moreover, consumers have more opportunities to purchase food directly from producers, with the number of farmers' markets operating in 2014 increased by 180 percent since 2006.⁴⁶



In.gredients, an Eastside staple that provides “farmer’s market offerings with grocery store hours”

Several local movements align Austin with the national trends. Local food advocates have established a strong presence of farmers markets, community supported agriculture (CSAs), farm stands, on-farm sales, and “pick your own” operations. Austin is home to 114 farms occupying over 9,400 acres that produce vegetables, fruits, nuts, and livestock that is sourced “locally”, which is part of the larger share of 8,700 farms that cover 1.7 million acres in the region – both of which fuel an economic engine that is the Food Sector.

Locally made consumer packaged goods (CPGs) is another cottage industry that is taking off in Austin. The City’s local food manufacturing – a \$738 million industry⁴⁷ – has seen growth as a result of a creative culture, a young population, capital-rich investors, and small co-packing spaces. Direct-to-retail operations are common, especially with the cooperation of small market and regional supermarkets such as Whole Foods, Wheatsville, and local co-ops. Further assisting the expansion of local CPGs are Challenge Prize and SKU, two food incubators or accelerators that pair entrepreneurs with possible investors and mentors. Of note, the economic impact of locally grown food sold directly for consumption is approximately a thousand times smaller than tourist food spending in the region. Still, the presence and growth of this phenomenon is vital in the appeal of the larger food sector to locals and visitors, reinforcing the need to view the local Food Sector holistically.

According a TXP 2013 report on the Economic Impact of Austin’s Food Sector, the Austin MSA generated \$4.1 billion in annual output (0.45% of GDP in the Austin MSA), \$1 billion in worker earnings, and 43,550 permanent jobs, in 2011 after including the multiplier effects. The highest contribution to the economy was visitor spending on retail food with two-thirds of the jobs and about 60% of the economic activity. Agriculture was responsible for just over 21% of the total jobs with manufacturing and distribution accounting for the remaining 12%.⁴⁸ Occupations in both of these sub-industries require a high school diploma or less and still offer living wages that range from \$10.20 an hour to \$18.19 an hour, according to 2014 Census data for the Austin region.⁴⁹

The base of the local Food Sector pyramid is consumption by visitors that value a product that is grown, processed, or provided by a local source. Austin’s burgeoning food scene is essential for reinforcing the overall tourism value proposition, improving local quality of life, and extending opportunity for economic participation across all segments of the labor force (i.e. culinary operations, food artisans, institutional buyers, and retailers). Additionally, findings from the TXP report prove the role of food in the local economy is intertwined across many sectors and

industries though it is seldom identified directly as a source of economic growth and development. Stogner focus on supporting the food sector may pave the way for more synergistic interactions, and increased collaboration between local farmers, chefs, and consumer packaged goods will lead to more jobs, output and earnings.

TOTAL ECONOMIC IMPACT OF FOOD: \$4.1 BILLION
or
0.45% of GDP in Austin Metro

AGRICULTURE	FOOD MANUFACTURING	FOOD DISTRIBUTION	GROCERY SALES	EATING & DRINKING	SALES TAX REVENUE
\$596 MILLION	\$738 MILLION	\$331 MILLION	\$449 MILLION	\$1.98 BILLION	\$63 MILLION
(Austin MSA)	(Austin MSA)	(Austin MSA)	(Austin MSA)	(Austin MSA)	(Austin MSA)

Source: The Economic Impact of Austin’s Food Sector, a study conducted by TXP, Inc. and commissioned by City of Austin’s Economic Development Department



Amy’s Ice Cream vendor serves and entertains a family at Austin Bergstrom International Airport



A vendor sells fresh and local produce at Hope Farmers Market in Downtown Austin



Lasagna moves through processing line at Michael Angelo’s production facility

FOOD

REGIONAL STRENGTHS	GAPS/OPPORTUNITIES
<ul style="list-style-type: none"> • 8,700 farms that cover 1.7 million acres are in the Austin MSA • Austin has a growing “Austin Food” brand, illustrated by the television featuring of South Congress Café, Franklin BBQ, the Broken Spoke, Magnolia Café, and other local restaurants • Austin has the demographic that most strongly supports the demand for local food: socioeconomically diverse, higher-earning, higher-educated individuals that are likely to grow a food garden, frequent health food stores, and purchase organic food⁵⁰ • Tourism is a major component of the Austin economy, and visitors are generally attracted to the City’s burgeoning food and beverage scene 	<ul style="list-style-type: none"> • With strategic investments and economic development, Austin has the opportunity to strengthen the “Austin Food” brand • Increased marketing and investments in local food producers may increase the City’s consumption of Austin-produced goods, reducing leakage and fortifying the local agriculture and food manufacturing industries • There is significant interest and need for increasing local food processing, which opens the door to living-wage jobs • There is a growing demand for local products, which increases the need for significant support for institutional purchasing of local food. This chain of demand could provide an opportunity for wholesale farmers markets and further spillover benefits for occupations such as transportation and logistics • Increased interest in localized food supply chains will generate demand for agricultural incubators, which will help producers and supporters scale-up; thereby, anchor investments in localized and sustainable food systems can spur growth via the multiplier effect

STRATEGIC APPROACH/INITIATIVES

Strategic Approach 1:

Austin’s Food Industry is ripe for development. Capitalizing on the “Austin Food” brand; increasing the marketing and community education of the role of local food; and identifying underutilized assets such as microlending programs and vacant land primed for urban agriculture will fortify the local Food Industry in a regional and national sense. Reaching that status will require participation from all segments of Austin’s labor force. In turn, the process of delivering a product from concept to shelf will touch nearly every component of the conventional value-chain.

Strategic Approach 2:

The Food Industry is conducive to catalyst projects such as incubators, accelerators, and contract packers (co-packers). Refinement of the industry will rely on investment within these spaces, as they lower the barriers to entry. They also foster an ecosystem that promotes information exchange; and, they connect investors with entrepreneurs. EDD is in the process of exploring resources related to business development and food processing capacity such as the Oregon State Food Innovation Center in Portland, which provides comprehensive technical assistance to start-up food manufacturers.



LIFE SCIENCES & TECHNOLOGY INTEGRATION

The Life Sciences & Technology Integration sector is broadly defined and extends far beyond health care providers to include biotechnology, scientific research and testing activities, and the manufacturing of medical products and devices, medicine/pharmaceutical products. The vertical linkages can have a profound impact on the delivery of health care services.⁵¹

The aforementioned Market Street report effectively articulates the development of the Life Sciences sector:

As the Baby Boom generation enters retirement, an increasing number of individuals will require health care and will purchase trillions of dollars-worth of medications and medical products. Most economic forecasters agree that health care will experience explosive growth in the coming decades. This growth will coincide with developments in life science research that will result in a new generation of highly specific drugs and medical devices, targeting ever more finite health areas. Various fields such as manufacturing, R&D, information technology, and patient care are converging, as health care providers increasingly use state-of-the-art technologies to optimize and personalize medical treatments and procedures. This field provides solid employment growth opportunities in the coming years.⁵²

Actualizing this forecast is the development of Austin’s growing cluster of innovative life science companies and technology integration. According to the Greater Austin Chamber of Commerce, “Austin is home to best-in-class research facilities, and boasts one of the most educated populations in the U.S.” Furthermore, “Dell Medical School at the University of Texas Austin, projected to open in 2016, will transform the local economy as dramatically as the semiconductor and dot com industries did in previous decades.”⁵³ The development of Seton Healthcare Family’s and Central Health’s \$295 million teaching hospital will be constructed adjacent to the new Dell Medical School. In tandem, the two developments will create a geographic and intellectual cluster around the Life Sciences industry in the forms of the Medical District, making the area ripe for further business growth.

A 2014 Austin Technology Council study approximates the Life Sciences & Technology Integration industry adds 6,052 jobs, and more than \$1 billion in value added to the regional economy. According to ATC, “the life sciences sector currently makes up a very small share of Austin’s \$100 billion economy, but offers significantly higher wages

Industry Profile of Life Sciences Sector in Austin MSA

Industry	Establishments	Jobs	Avg Wage	Value Added
Pharmaceutical Preparation Manufacturing	7	11,156	\$64,041	\$355,013,059
R&D in Physical, Engineering, and Life Sciences	94	2,364	\$70,275	\$225,384,854
Research & Development in Biotechnology	63	1,099	\$100,235	\$153,722,322
Surgical Appliance and Supplies Manufacturing	14	527	\$70,677	\$117,947,535
Biological Product Manufacturing	6	421	\$81,295	\$100,663,640
Surgical and Medical Instrument Manufacturing	10	213	\$84,513	\$44,826,803
In-Vitro Diagnostic Substance Manufacturing	2	99	\$61,861	\$16,741,173
Analytical Laboratory Instrument Manufacturing	3	120	\$57,595	\$11,020,425
Electromedical & Electrotherapeutic Apparatus Manufacturing	3	11	\$59,427	\$4,844,924
Ophthalmic Goods Manufacturing	2	38	\$40,888	\$3,899,562
Medicinal and Botanical Manufacturing	N/A	<10	N/A	\$950,873
Dental Equipment and Supplies Manufacturing	N/A	<10	N/A	\$320,233
Irradiation Apparatus Manufacturing	N/A	<10	N/A	\$98,542
Total	204	6,052	\$75,209	\$1,035,433,947

Source: Austin Technology Council’s Economic Impact of the Life Sciences Sector. EMSI. Establishments, jobs, and average wage estimates are for 2013. Value added (i.e. contribution to Austin-Round RockSan Marcos MSA gross regional product) is for 2012. N/A is not available. Establishments are defined as business locations (one firm can have multiple locations). Jobs include self-employed.

compared to other industries: The average wage in the life sciences sector in the Austin MSA is \$75,209, compared to \$49,557 for the regional economy as a whole.”⁵⁴ Texas A&M University reported, “Texas has a huge market for medical equipment and supplies manufacturing...when compared to other major markets in Texas, the Austin-San Marcos market had the highest annual sales volume in 2010...annual sales in Austin are expected to reach \$4.8 billion in 2016.”⁵⁵

The Life Sciences workforce in Austin requires significantly higher levels of education and training than the regional labor market as a whole: The majority (51%) of Life Sciences sector jobs in the Austin MSA require a postsecondary degree or credential, compared to 32% for all industries.⁵⁶ Still, the sector provides ample access to jobs for those with less than a four-year degree, which is directly in line with the Economic Development Department’s strategy of creating opportunity across the spectrum of low-skill, middle-skill, and high-skill segments of the labor market. Of the top ten most employed occupations within the industry, eight require an associate’s degree or less; and, demand for middle-skill occupations such as nursing assistants, medical assistants, and laboratory technicians is sure to grow with the development of the Innovation Zone, the Dell Medical School, and Seton Teaching Hospital.



Renderings of the Dell Seton Medical Center at the University of Texas

LIFE SCIENCES AND TECHNOLOGY INTEGRATION

REGIONAL STRENGTHS	GAPS/OPPORTUNITIES
<ul style="list-style-type: none"> • The Dell Medical School and Seton Teaching Hospital have the potential to position Texas and Greater Austin as a competitive location for bioscience firms and research while creating 19,307 new jobs in the region⁵⁷ • Strong regional hospitals and health care networks • Development of a Innovation/Medical District • Strong two-year training programs and output for health care support professionals • University of Texas-Austin research centers: Biomedical Engineering Laser Laboratory (BELL); Center for Biological and Medical Engineering; Center for Computational Biology and Bioinformatics; Center for Health Promotion and Disease Prevention Research in Underserved Populations; Center for Molecular and Cellular Toxicology; Center for Structural Biology; Center for Systems and Synthetic Biology; Drug Dynamics Institute; Female Sexual Psychophysiology Laboratory; Human Factors Research Project; Institute for Cellular and Molecular Biology; Waggoner Center for Alcohol and Addiction Research • Austin Technology Incubator – Biosciences 	<ul style="list-style-type: none"> • An aging U.S. population will increase the demand for biomedical and health care services • Increased growth around the medical school and teaching hospital would increase research funding at UT-Austin. A report by the Perryman Group found that research expenditures by universities without medical schools totaled \$75.3 million compared to \$224.8 million for universities with medical schools nationwide⁵⁸ • Increased cluster growth will provide Central Texas residents with better access to health care while tapping into the San Antonio, Dallas, and Houston market share • Strategic investment in the industry can secure Austin’s future as a hub for medical innovative treatment According to a 2012 TXP report on the impact of the medical school and teaching hospital, 60 percent of the jobs will require less than a bachelor’s degree, which provides ample career opportunity for our target population⁵⁹ • Creation of a formal and codified Innovation District/Innovation Zone

STRATEGIC APPROACH/INITIATIVES

Strategic Approach 1: Fostering the Life Sciences and Technology Integration industry cluster is essential to increasing job access across all segments of the labor force. Life Sciences and Technology Integration may appear to skew heavily toward higher-skilled workers, but the cluster actually hinges on middle- to lower-skilled occupations. Administrative assistants, lab technicians, and medical assistants are professions that have relatively low barriers to entry; and, they provide stable, livable wages.

Strategic Approach 2: The Life Sciences and Technology Integration industry cluster is one that has the potential to attract significant outside investment, which the City may leverage to maximize its goals. As it is, the forthcoming Innovation District (anchored by the Dell Medical School and the Seton Teaching Hospital) is a prime asset the City may utilize for business recruitment, tailored workforce development programming, or public-private partnerships for economic development.



MOBILITY INNOVATIONS: AUTOMOTIVE & AEROSPACE

The ubiquitous and disruptive nature of technology across all industries is blending the divide between historical cluster taxonomies, and the Automotive and Aerospace industries are no exception to the rule. Product developers in these fields are identifying attributes of the latest innovations that cross-pollinate over the two markets, as the two industries are utilizing the similar resources and are generating parallel breakthroughs that feed the other. National trends in the Aerospace industry alone show that it is a \$314 billion market that is growing at 4% annually; interests and investments from other industries – such as Google’s acquisition of space start-up Skybox for \$500 million –are fueling this growth.⁶⁰ The acquisition of the Goodrich Corporation by high-tech conglomerate United Technologies is another example of the overlap between the Aerospace and Automotive industries.



A pair of satellites – AggieSat4 built by Texas A&M and Bevo-2 built by the **University of Texas-Austin** – being released from the International Space Station in Jan. 2016 as part of the LONESTAR investigation

The symbiotic relationship between Aerospace and Automotive has developed a Mobility Innovation cluster, which is rooted in space exploration, satellites, launch providers, spacecraft components, in-space services, software, robotics, energy recovery systems (ERS), lithium-ion batteries, power cells, electrical power systems, renewable/alternative fuels, and engine control systems. The Mobility Innovations industry opens the door for job creation, development of regional economic growth poles, and recognition of the city as a player in the rapidly-growing market of commercial space exploration and advanced technology in the automotive space.



Teams prepare for the 2013 Formula Sun Grand Prix – an annual collegiate solar car race – held at the Circuit of the Americas Complex

Invaluable automotive industry assets and scale exist in Austin: Freescale, US Farathane, TASUS, and Telogis have invested in the economy, employed local talent, and strengthened the existing Mobility Innovations market. Of note, Google has taken to the streets of Austin –one of four cities in the United States – to test a fleet of vehicles that are designed to be fully self-driving. Meanwhile with respect to Aerospace, seven “new space” companies have headquartered in Austin, spanning a broad array of sectors, which include: small satellites, small launch providers, software, human space flight, and space-based energy.⁶¹ Both sub-industries of Mobility Innovations are ideal for middle-skill jobs, as each require the use of electromechanical equipment assemblers, mechanical engineering technicians, and other occupations that seek talent from vocational school and certificate programs.

The Mobility Innovations sector operates on the cutting edge of next-age technology, where spontaneous collisions of transformative ideas, perspectives, and opportunities are ubiquitous and more broadly accepted relative to the traditionally protected siloes of other markets. Thus, development of the Mobility Innovation clusters is likely to have positive spillover effects to other industries. According to Phil Wilson, Chairman of the Opportunity Austin Board of Directors, “the emerging commercial space economy adds to the diversity of business in [the Austin] region and has the potential to create additional opportunities for other sectors like cloud technology, energy, and medicine.”⁶²

MOBILITY INNOVATIONS

REGIONAL STRENGTHS	GAPS/OPPORTUNITIES
<ul style="list-style-type: none"> • Circuit of the Americas • Strong presence of advanced technology companies • UT-Austin master’s degree in Space Entrepreneurship beginning in May 2015 • UT-Aerospace Department • Greater Austin Space Economy Task Force • Austin has seven local “new space” companies • Robotics program at UT- Austin, which entails the ReNeu Robotics Lab, the Human Centered Robotics Lab, the ReWire Lab, Learning Agents Research Group, and the Nuclear Robotics Group • Austin is a hub for manufacturing transportation technology and innovation • Austin was a final contender for The Smart City Challenge, a U.S. Department of Transportation program 	<ul style="list-style-type: none"> • The surge of new space investment in the U.S. creates an opportunity for a U.S.-based, accredited space leadership program, and Austin may fill that void • Geographic proximity allows Austin to leverage the intellectual capital around Houston’s space program in the quest for developing ‘new space’ innovations • Space exploration and exploration is a \$314 billion market, and capitalizing on the emerging commercial space economy will add diversity to the region’s business landscape • There is a surge of new space investments in the United States but a shortage of talent to catapult the industry. An increased presence of the cluster may generate interest in the potential workforce, bolster Austin’s talent pool with the help of UT’s master’s degree in Space Entrepreneurship, and establish the City as the premier hub for new space technology

STRATEGIC APPROACH/INITIATIVES

Strategic Approach 1:

Factors of production in the Mobility Innovations industry cluster requires the use of high- to low-skill workers i.e. product development, product manufacturing, and product distribution.

Strategic Approach 2:

The City of Austin is seeking to leverage private initiatives to jump start the New Space movement within the region; assets such as a commercial launch facility in Brownsville, TX, a SpaceX rocket test facility in McGregor, and the Johnson Space Center provide respective breakthroughs and history, which may be tapped by future innovators in the industry.



ZERO WASTE



As summarized in the CleanTX’s 2015 Economic Impact of the Cleantech Sector report, “Clean Technology is a set of technologies and services developed across a number of industries in response to concerns about climate change, energy security, and resource depletion.” According to the report, the cleantech industry in the Austin region employs nearly 20,000 individuals and contributes approximately \$2.5 billion to the region’s GDP. Furthermore, it is poised for significant growth over

the next six years: From 2014-2020, employment is projected to grow 11.24% in the Austin MSA, which outpaces the 9.3% growth rate at the state level and the projected national rate of 6.37% over the same period.⁶³

Cleantech is unlike other traditional sectors in that it is robust catch-all for firms and industries, i.e. renewables, energy storages and smart cities, connected mobility, water management, recycling and waste management, and advanced manufacturing. The Economic Development Department values all corners of the cluster, yet it recognizes sizeable opportunities in the recycling & waste management space, or Zero Waste. The clean economy is one that provides countless benefits to Austin.

Business focused around sustainability, waste reduction, reuse, recycling, materials management, composting, household hazardous waste collection, and disposal management comprise the efforts around Zero Waste. According to the Austin Resource Recovery Master Plan, “Zero Waste is a paradigm shift from waste management to materials management. This new approach treats materials collected as resources that have secondary lives, not waste streams.”⁶⁴ Where refuse once met landfills as a resting place, these new efforts open the door to opportunities in promoting a sustainable community with respect to the environment *and* the labor market: According to the Institute for Local Self-Reliance, for every 10,000 tons of waste land filled, only 1 job is created. Meanwhile for every 10,000 tons of organic materials composted, 4 jobs are created. For every 10,000 tons of recyclables processed, 10 jobs are created. For every 10,000 tons of reusables processed, 75-250 jobs are created.⁶⁵

In 2014, recycling activity in the Austin MSA directly generated \$402 million in revenue and employed over 1000 individuals. When accounting for indirect and induced benefits, the recycling sector of Austin’s economy accounted for just over \$720 million in total economic activity, \$110 million in labor compensation, and approximately 2,673 permanent jobs.⁶⁶ Of these jobs, nearly half have resided in the solid waste collection sub-industry, which typically utilizes refuse and recyclable material collectors – an occupation that requires less than a high school diploma and still offers an hourly wage of \$15.46 in the Austin region.⁶⁷

Jobs from Discards

Market Category	Tons Per Year (Thousands)	Potential Jobs
Reuse	20	249
Paper	360	63
Plant Trimmings	200	60
Putrescibles	90	40
Wood	60	36
Ceramics	20	7
Soils	10	20
Metals	50	29
Glass	50	125
Polymers	80	745
Textiles	50	425
Chemicals	10	20
Total	1,000	1,819

Source: Austin Zero Waste Strategic Plan. Based on analysis done by Institute for Local Self-Reliance for State of Delaware 2005

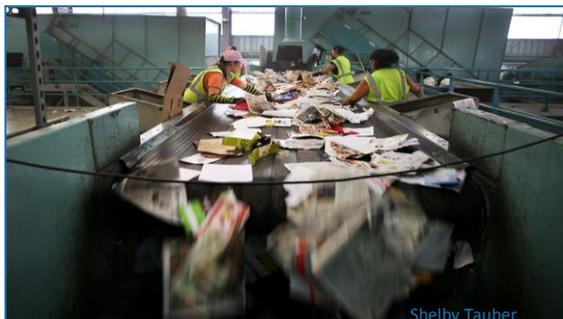
“The recycling sector of Austin’s economy accounted for just over \$720 million in total economic activity, \$110 million in labor compensation, and approximately 2,673 permanent jobs”

Job Creation: Reuse and Recycling vs Disposal

Type of Operation	Jobs per 10,000 Tons Per Year
Product Reuse	
Computer Reuse	296
Textile Reclamation	85
Misc. Durables Reuse	62
Wooden Pallet Repair	28
Recycling-based Manufacturers	25
Paper Mills	18
Glass Product Manufacturers	26
Plastic Product Manufacturers	93
Conventional Materials Recovery Facilities	10
Composting	4
Landfill and Incineration	1

Source: Institute for Local Self Reliance

The continued development of Austin’s Zero Waste industry provides a strategic opportunity for business recruitment and expansion. With an abundance of raw materials, policy support, and available labor, Austin has a marketable competitive advantage in the industry. Fostering such a cluster will generate an ecosystem that is sure to yield countless benefits for the City.



Single-stream recycled goods are collected, received, sorted, and packaged by the City of Austin and Balcones Resources at a 100,000-square-foot materials recovery facility in Northeast Austin. The City’s partnership with Balcones Resources is the third largest investment by a privately held recycling company in the state of Texas and will help the city achieve its zero-waste goal.

ZERO WASTE

REGIONAL STRENGTHS	GAPS/OPPORTUNITIES
<ul style="list-style-type: none"> • The City Council adopted the Austin Resource Recovery Master Plan in 2011 that has the ultimate goal of a zero waste economy (90% landfill diversion) by 2040, and along the way, provide opportunities for industry to facilitate the process • The Universal Recycling Ordinance has created an increased supply of diverted recyclables and organic material and an increased demand for recycling collection and sorting services • The Austin Materials Marketplace, a business-to-business reuse marketplace, that can identify reusable, repairable, and recyclable waste products or help a business lower costs by supplanting a virgin material for a reused material • Special promotion of reuse stores, remade products, and repair and rental services through the Shop Zero Waste initiative on LocallyAustin.org • Factors of production are fairly cost-competitive in Austin, especially compared to markets in the Northeast and on the West Coast. Furthermore, “Made in Austin” is beginning to gain traction from a brand perspective, suggesting products produced here may enjoy an additional market advantage in the recycling and remanufacturing space⁶⁸ 	<ul style="list-style-type: none"> • Approximately 68% of materials generated in the City are collected by private sector service providers and private recyclers located in the City of Austin⁶⁹ • Implementing Zero Waste initiatives in Austin has the potential to generate 1,000 to 5,000 new local, green jobs in recycling and organics collection and processing, materials reuse and repair, and remanufacturing.⁷⁰ Manufacturing-related recycling and reuse activity alone has the potential to create nearly 1,400 jobs⁷¹ • Austin residents are estimated to dispose of \$43 million in reusable items annually⁷² • The future development of the Austin [re]Manufacturing Hub, the City’s first eco-industrial park, which will open approximately 100 acres of industrial land for zero waste manufacturing businesses • Glass, plastic, and construction and demolition materials represent significant market opportunities • There is a strong local presence of manufacturers in the food and beverage sector in Austin that largely rely on packaging materials and services provided elsewhere. These firms in theory could become customers of locally packaged products composed of locally remanufactured materials

STRATEGIC APPROACH/INITIATIVES

Strategic Approach 1:

Austin is rich in both innovative and hands-on capital, and establishing a strong Zero Waste industry will require both. Considering the minimal skill requirements necessary for manufacturing/remanufacturing, refuse processing, and materials reuse and repair, Zero Waste is a strong candidate for Austin’s discouraged and marginally attached workers that may lack the job history required by most employers.

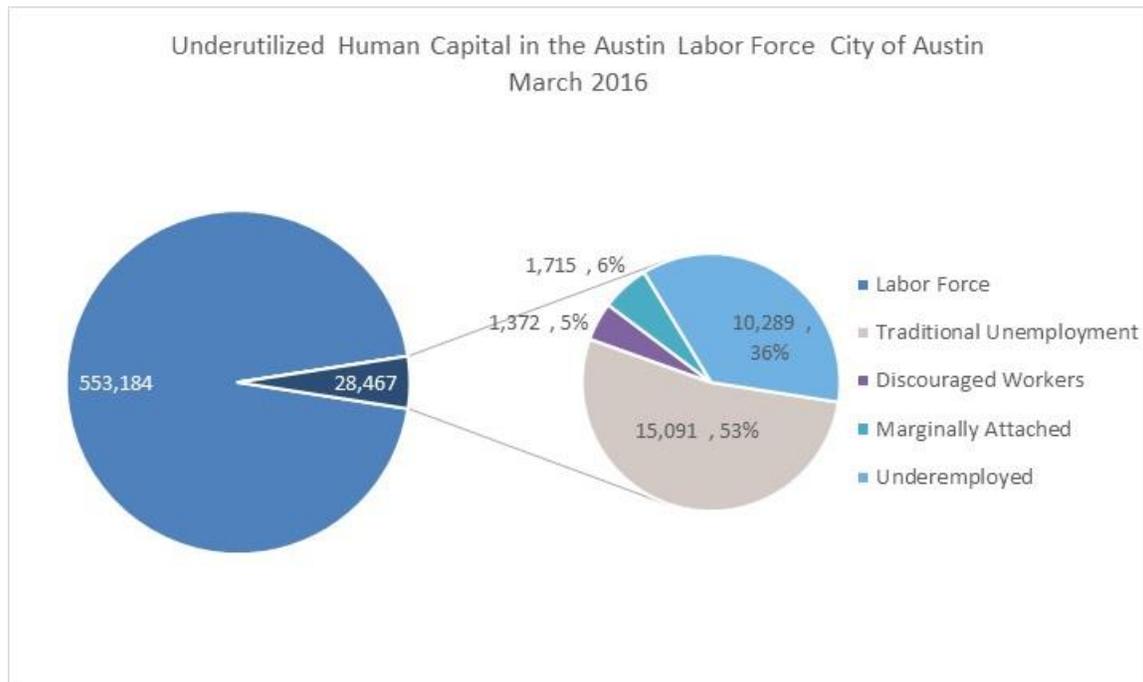
Strategic Approach 2:

The forthcoming [Re]manufacturing Hub is an example of a critical catalyst project that is primed for anchor institutions take root and eventually spur future business development within Zero Waste.

APPENDIX

APPENDIX A: UNDERUTILIZATION IN AUSTIN

Underutilized Human Capital in the Austin Labor Force - City of Austin March 2016				
Measure of Unemployment	Definition	Breakdown	City of Austin Total: September 2015	City of Austin Rate: March 2016
U-1	Persons unemployed 15 weeks or longer	-	5,488	0.99%
U-2	Job losers and persons who completed temporary jobs	1,101	7,202	1.30%
U-3	Total unemployed - all jobless persons who are available to take a job and have actively sought work in the past four weeks	7,888	15,091	2.73%
U-4	Total unemployed, plus discouraged workers (persons not in the labor force who want and are available for a job and who have looked for work sometime in the past 12 months, but who are not currently looking because they believe there are no jobs available or there are no jobs for which they would qualify)	1,101 Discouraged Workers	16,463	2.98%
U-5	Total unemployed, plus discouraged workers, plus marginally attached workers (Persons not in the labor force who want and are available for work, and who have looked for a job sometime in the prior 12 months (or since the end of their last job if they held one within the past 12 months), but were not counted as unemployed because they had not searched for work in the 4 weeks preceding the survey . Discouraged workers are a subset of marginally attached workers.	2,202 Total Marginally Attached Workers	18,178	3.29%
U-6	Total unemployed, plus all marginally attached workers, plus those employed part-time for economic reasons (persons who indicated that they would like to work full-time but were working part time , or 1-34 hours, because of an economic reason or they were unable to find full-time jobs ; also known as underemployed)	11,742 Underemployed	28,467	5.15%



**APPENDIX B:
DETAILED OCCUPATIONAL TABLES**

Legend	
Education	Abbreviation
Less Than High School	LTHS
High School Diploma or Equivalent	HSDoE
Some College, No degree	SCND
Postsecondary Non-Degree Award	PNDA
Associate's Degree	AD
Bachelor's Degree	BD
Master's Degree	MD
Doctoral or Professional Degree	DoPD

Source: Texas Workforce Commission, Capital Area Workforce Development Long-term Occupational Projections

ADVANCED MANUFACTURING AND DISTRIBUTION & LOGISTICS

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Cleaning, Washing, & Metal Pickling Equipment Operators & Tenders	LTHS	None		
Conveyor Operators & Tenders	LTHS	None	\$15.19	\$31,600
Conveyor Operators & Tenders	LTHS	None	\$15.19	\$31,600
Cutters & Trimmers, Hand	LTHS	None		
Grinding & Polishing Workers, Hand	LTHS	None		
Helpers--Production Workers	LTHS	None	\$11.16	\$23,204
Industrial Truck & Tractor Operators	LTHS	None	\$13.99	\$29,097
Industrial Truck & Tractor Operators	LTHS	None	\$13.99	\$29,097
Laborers & Freight, Stock, & Material Movers, Hand	LTHS	None	\$12.13	\$25,228
Laborers & Freight, Stock, & Material Movers, Hand	LTHS	None	\$12.13	\$25,228
Machine Feeders & Offbearers	LTHS	None		
Machine Feeders & Offbearers	LTHS	None		
Material Moving Workers, All Other	LTHS	None		
Material Moving Workers, All Other	LTHS	None		
Packers & Packagers, Hand	LTHS	None	\$11.59	\$24,106
Packers & Packagers, Hand	LTHS	None	\$11.59	\$24,106
Painting, Coating, & Decorating Workers	LTHS	None		
Stock Clerks & Order Fillers	LTHS	None	\$12.82	\$26,660
Stock Clerks & Order Fillers	LTHS	None	\$12.82	\$26,660
Tank Car, Truck, & Ship Loaders	LTHS	None		
Tank Car, Truck, & Ship Loaders	LTHS	None		
Adhesive Bonding Machine Operators & Tenders	HSDoE	None		
Aircraft Structure, Surfaces, Rigging, & Systems Assemblers	HSDoE	None		
Assemblers & Fabricators, All Other	HSDoE	None	\$17.40	\$36,201
Cargo & Freight Agents	HSDoE	None	\$18.97	\$39,457
Cargo & Freight Agents	HSDoE	None	\$18.97	\$39,457
Chemical Equipment Operators & Tenders	HSDoE	None	\$19.49	\$40,541
Coating, Painting, & Spraying Machine Setters, Operators, & Tenders	HSDoE	None	\$13.23	\$27,521
Coil Winders, Tapers, & Finishers	HSDoE	None		
Computer Numerically Controlled Machine Tool Programmers, Metal/Plastic	HSDoE	None	\$25.80	\$53,670
Computer-Controlled Machine Tool Operators, Metal/Plastic	HSDoE	None	\$14.17	\$29,481
Cooling & Freezing Equipment Operators & Tenders	HSDoE	None		
Crushing, Grinding, & Polishing Machine Setters, Operators, & Tenders	HSDoE	None		
Cutting & Slicing Machine Setters, Operators, & Tenders	HSDoE	None	\$11.96	\$24,873
Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$13.22	\$27,506
Drilling & Boring Machine Tool Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None		
Driver/Sales Workers	HSDoE	None	\$12.87	\$26,763
Driver/Sales Workers	HSDoE	None	\$12.87	\$26,763
Electrical & Electronic Equipment Assemblers	HSDoE	None	\$14.57	\$30,304
Electromechanical Equipment Assemblers	HSDoE	None	\$17.53	\$36,456
Engine & Other Machine Assemblers	HSDoE	None		
Extruding & Drawing Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None		
Extruding, Forming, Pressing, & Compacting Machine Setters, Operators, & Tenders	HSDoE	None	\$15.16	\$31,529
Fiberglass Laminators & Fabricators	HSDoE	None		
First-Line Supervisors of Helpers, Laborers, & Material Movers, Hand	HSDoE	≤ 5 years	\$24.12	\$50,167
First-Line Supervisors of Transportation & Material-Moving Machine & Vehicle Operators	HSDoE	≤ 5 years	\$24.52	\$50,998
Forging Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None		
Foundry Mold & Coremakers	HSDoE	None		
Furnace, Kiln, Oven, Drier, & Kettle Operators & Tenders	HSDoE	None		
Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$13.84	\$28,789
Heat Treating Equipment Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None		
Industrial Machinery Mechanics	HSDoE	None	\$26.42	\$54,948
Inspectors, Testers, Sorters, Samplers, & Weighers	HSDoE	None	\$17.80	\$37,021
Lathe & Turning Machine Tool Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$18.76	\$39,014
Layout Workers, Metal/Plastic	HSDoE	None		
Light Truck or Delivery Services Drivers	HSDoE	None	\$18.19	\$37,841
Light Truck or Delivery Services Drivers	HSDoE	None	\$18.19	\$37,841
Machinists	HSDoE	None	\$20.01	\$41,627
Machinists	HSDoE	None	\$20.01	\$41,627
Metal Workers & Plastic Workers, All Other	HSDoE	None		
Metal-Refining Furnace Operators & Tenders	HSDoE	None		
Milling & Planing Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$20.15	\$41,918

ADVANCED MANUFACTURING AND DISTRIBUTION & LOGISTICS (CONTINUED)

Mixing & Blending Machine Setters, Operators, & Tenders	HSDoE	None	\$16.44	\$34,189
Molders, Shapers, & Casters, Ex. Metal/Plastic	HSDoE	None		
Molding, Coremaking, & Casting Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None		
Multiple Machine Tool Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$18.16	\$37,779
Packaging & Filling Machine Operators & Tenders	HSDoE	None	\$12.07	\$25,112
Painters, Transportation Equipment	HSDoE	None	\$22.11	\$45,986
Plating & Coating Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$12.68	\$26,376
Pourers & Casters, Metal	HSDoE	None		
Production Workers, All Other	HSDoE	None	\$14.55	\$30,267
Production, Planning, & Expediting Clerks	HSDoE	None	\$23.11	\$48,078
Production, Planning, & Expediting Clerks	HSDoE	None	\$23.11	\$48,078
Rolling Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None		
Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders	HSDoE	None	\$18.85	\$39,213
Shipping, Receiving, & Traffic Clerks	HSDoE	None	\$13.79	\$28,685
Shipping, Receiving, & Traffic Clerks	HSDoE	None	\$13.79	\$28,685
Structural Metal Fabricators & Fitters	HSDoE	None	\$15.89	\$33,058
Team Assemblers	HSDoE	None	\$12.52	\$26,052
Tool & Die Makers	HSDoE	None		
Tool Grinders, Filers, & Sharpeners	HSDoE	None		
Transportation, Storage, & Distribution Managers	HSDoE	≥ 5 years	\$47.11	\$97,989
Weighers, Measurers, Checkers, & Samplers, Recordkeeping	HSDoE	None	\$10.95	\$22,774
Weighers, Measurers, Checkers, & Samplers, Recordkeeping	HSDoE	None	\$10.95	\$22,774
Welders, Cutters, Solderers, & Brazers	HSDoE	None	\$17.88	\$37,181
Welding, Soldering, & Brazing Machine Setters, Operators, & Tenders	HSDoE	None		
First-Line Supervisors of Production & Operating Workers	PNDA	≤ 5 years	\$30.20	\$62,820
Heavy & Tractor-Trailer Truck Drivers	PNDA	None	\$19.68	\$40,940
Heavy & Tractor-Trailer Truck Drivers	PNDA	None	\$19.68	\$40,940
Semiconductor Processors	AD	None	\$17.64	\$36,690
Logisticians	BD	None	\$42.58	\$88,563
Purchasing Managers	BD	≥ 5 years	\$57.09	\$118,746

CREATIVE SECTOR

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Artists & Related Workers, All Other	HSDoE	None		
Choreographers	HSDoE	≥ 5 years		
Costume Attendants	HSDoE	None		
Craft Artists	HSDoE	None		
Dancers	HSDoE	None	\$12.93	NA
Entertainment Attendants & Related Workers, All Other	HSDoE	None		
Fine Artists, Inc. Painters, Sculptors, & Illustrators	HSDoE	None	\$24.56	\$51,082
Floral Designers	HSDoE	None	\$12.97	\$26,973
Locker Room, Coatroom, & Dressing Room Attendants	HSDoE	None	\$9.80	\$20,388
Media & Communication Equipment Workers, All Other	HSDoE	None	\$30.52	\$63,477
Media & Communication Workers, All Other	HSDoE	None	\$20.69	\$43,044
Merchandise Displayers & Window Trimmers	HSDoE	None	\$13.20	\$27,460
Musical Instrument Repairers & Tuners	HSDoE	None		
Musicians & Singers	HSDoE	None	\$28.46	NA
Photographers	HSDoE	None	\$15.48	\$32,203
Photographic Process Workers & Processing Machine Operators	HSDoE	None	\$13.02	\$27,075
Precision Instrument & Equipment Repairers, All Other	HSDoE	None		
Print Binding & Finishing Workers	HSDoE	None	\$14.69	\$30,553
Printing Press Operators	HSDoE	None	\$17.30	\$35,983
Public Address System & Other Announcers	HSDoE	None		
Computer User Support Specialists	SCND	None	\$23.94	\$49,793
Audio & Video Equipment Technicians	PNDA	None	\$18.41	\$38,283
Prepress Technicians & Workers	PNDA	None	\$18.04	\$37,513
Sound Engineering Technicians	PNDA	None	\$25.36	\$52,748
Computer Network Support Specialists	AD	None	\$29.43	\$61,215
Web Developers	AD	None	\$34.10	\$70,920
Art Directors	BD	≥ 5 years	\$37.11	\$77,195
Broadcast News Analysts	BD	None		
Camera Operators, Television, Video, & Motion Picture	BD	None	\$21.73	\$45,193
Commercial & Industrial Designers	BD	None	\$23.15	\$48,156
Computer Network Architects	BD	≥ 5 years	\$58.24	\$121,140
Computer Occupations, All Other	BD	None	\$40.86	\$84,982
Computer Programmers	BD	None	\$41.52	\$86,372
Database Administrators	BD	≤ 5 years	\$35.56	\$73,959
Designers, All Other	BD	None	\$23.82	\$49,539
Editors	BD	≤ 5 years	\$25.07	\$52,153
Fashion Designers	BD	None		
Film & Video Editors	BD	None	\$23.29	\$48,442
Graphic Designers	BD	None	\$22.47	\$46,734
Information Security Analysts	BD	≤ 5 years	\$44.02	\$91,569
Interior Designers	BD	None	\$26.25	\$54,603
Interpreters & Translators	BD	None	\$29.40	\$61,157
Multimedia Artists & Animators	BD	None	\$24.80	\$51,576
Music Directors & Composers	BD	≤ 5 years	\$25.95	\$53,974
Network & Computer Systems Administrators	BD	None	\$39.00	\$81,120
Producers & Directors	BD	≤ 5 years	\$26.65	\$55,426
Public Relations Specialists	BD	None	\$31.79	\$66,122
Reporters & Correspondents	BD	None	\$21.95	\$45,647
Set & Exhibit Designers	BD	None	\$17.40	\$36,184
Software Developers, Applications	BD	None	\$45.12	\$93,856
Software Developers, Systems Software	BD	None	\$49.10	\$102,124
Technical Writers	BD	≤ 5 years	\$33.95	\$70,625
Writers & Authors	BD	None	\$26.96	\$56,078
Computer & Information Research Scientists	DoPD	None	\$59.02	\$122,765
Computer Systems Analysts	Mas	None	\$37.19	\$77,350

FASHION

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Models	LTHS	None		
Pressers, Textile, Garment, & Related Materials	LTHS	None	\$10.61	\$22,069
Retail Salespersons	LTHS	None	\$13.89	\$28,894
Sewers, Hand	LTHS	None	\$12.72	\$26,467
Sewing Machine Operators	LTHS	None	\$10.43	\$21,693
Tailors, Dressmakers, & Custom Sewers	LTHS	None	\$11.92	\$24,800
Craft Artists	HSDoE	None		
Electrical & Electronic Equipment Assemblers	HSDoE	None	\$14.57	\$30,304
Extruding & Forming Machine Setters, Operators, & Tenders, Synthetic & Glass Fibers	HSDoE	None		
Fabric & Apparel Patternmakers	HSDoE	None		
Jewelers & Precious Stone & Metal Workers	HSDoE	None	\$19.91	\$41,405
Merchandise Displayers & Window Trimmers	HSDoE	None	\$13.20	\$27,460
Textile Cutting Machine Setters, Operators, & Tenders	HSDoE	None		
Textile, Apparel, & Furnishings Workers, All Other	HSDoE	None	\$9.99	\$20,772
Upholsterers	HSDoE	None		
Electrical & Electronics Engineering Technicians	AD	None	\$32.78	\$68,175
Computer Programmers	BD	None	\$41.52	\$86,372
Computer Systems Analysts	BD	None	\$37.19	\$77,350
Electrical Engineers	BD	None	\$52.86	\$109,948
Fashion Designers	BD	None		
Graphic Designers	BD	None	\$22.47	\$46,734
Materials Engineers	BD	None	\$42.03	\$87,430
Materials Scientists	BD	None	\$39.73	\$82,648
Multimedia Artists & Animators	BD	None	\$24.80	\$51,576
Set & Exhibit Designers	BD	None	\$17.40	\$36,184
Software Developers, Applications	BD	None	\$45.12	\$93,856
Software Developers, Systems Software	BD	None	\$49.10	\$102,124
Medical Scientists, Ex. Epidemiologists	DoPD	None	\$40.34	\$83,913

FOOD

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Agricultural Equipment Operators	LTHS	None		
Bakers	LTHS	None	\$12.40	\$25,791
Bartenders	LTHS	None	\$10.38	\$21,582
Butchers & Meat Cutters	LTHS	None	\$15.15	\$31,508
Combined Food Preparation & Serving Workers, Incl. Fast Food	LTHS	None	\$9.52	\$19,797
Cooks, All Other	LTHS	None	\$12.76	\$26,546
Cooks, Fast Food	LTHS	None	\$8.79	\$18,292
Cooks, Institution & Cafeteria	LTHS	None	\$11.21	\$23,327
Cooks, Restaurant	LTHS	≤ 5 years	\$11.00	\$22,872
Cooks, Short Order	LTHS	None	\$9.12	\$18,974
Counter Attendants, Cafeteria, Food Concession, & Coffee Shop	LTHS	None	\$8.63	\$17,946
Dining Room & Cafeteria Attendants & Bartender Helpers	LTHS	None	\$8.85	\$18,406
Dishwashers	LTHS	None	\$9.23	\$19,188
Farmworkers & Laborers; Crop, Nursery, & Greenhouse	LTHS	None	\$12.86	\$26,741
Farmworkers; Farm, Ranch, & Aquacultural Animals	LTHS	None	\$16.38	\$34,066
Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	LTHS	None	\$12.57	\$26,152
Food Preparation & Serving Related Workers, All Other	LTHS	None	\$9.70	\$20,186
Food Preparation Workers	LTHS	None	\$10.64	\$22,135
Food Processing Workers, All Other	LTHS	None	\$10.20	\$21,217
Food Servers, Nonrestaurant	LTHS	None	\$12.66	\$26,327
Graders & Sorters, Agricultural Products	LTHS	None		
Hosts & Hostesses, Restaurant, Lounge, & Coffee Shop	LTHS	None	\$9.05	\$18,814
Meat, Poultry, & Fish Cutters & Trimmers	LTHS	None	\$11.22	\$23,345
Slaughterers & Meat Packers	LTHS	None		
Waiters & Waitresses	LTHS	None	\$9.52	\$19,805
Animal Breeders	HSDoE	≤ 5 years		
Buyers & Purchasing Agents, Farm Products	HSDoE	None	\$26.08	\$54,242
Chefs & Head Cooks	HSDoE	≥ 5 years	\$18.16	\$37,770
Farm Equipment Mechanics & Service Technicians	HSDoE	None		
First-Line Supervisors of Food Preparation & Serving Workers	HSDoE	≤ 5 years	\$16.25	\$33,790
Food Batchmakers	HSDoE	None	\$12.61	\$26,230
Food Cooking Machine Operators & Tenders	HSDoE	None		
Food Service Managers	HSDoE	≤ 5 years	\$26.48	\$55,074
Light Truck or Delivery Services Drivers	HSDoE	None	\$18.19	\$37,841
Cooks, Private Household	PNDA	≤ 5 years		
Agricultural & Food Science Technicians	AD	None		
Agricultural Inspectors	BD	None		
Environmental Scientists & Specialists, Inc. Health	BD	None	\$29.72	\$61,824
Food Scientists & Technologists	BD	None		
Geoscientists, Ex. Hydrologists & Geographers	BD	None	\$40.43	\$84,091
Logisticians	BD	None	\$42.58	\$88,563
Soil & Plant Scientists	BD	None		

LIFE SCIENCES & TECHNOLOGY INTEGRATION

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Home Health Aides	LTHS	None	\$10.28	\$21,385
Dental Laboratory Technicians	HSDoE	None	\$15.38	\$31,982
Dental Laboratory Technicians	HSDoE	None	\$15.38	\$31,982
Health Technologists & Technicians, All Other	HSDoE	None	\$22.63	\$47,077
Healthcare Support Workers, All Other	HSDoE	None	\$18.04	\$37,530
Healthcare Support Workers, All Other	HSDoE	None	\$18.04	\$37,530
Hearing Aid Specialists	HSDoE	None		
Medical Appliance Technicians	HSDoE	None	\$16.77	\$34,887
Medical Appliance Technicians	HSDoE	None	\$16.77	\$34,887
Medical Equipment Preparers	HSDoE	None	\$13.19	\$27,443
Medical Equipment Preparers	HSDoE	None	\$13.19	\$27,443
Occupational Health & Safety Technicians	HSDoE	None	\$23.74	\$49,383
Occupational Therapy Aides	HSDoE	None		
Occupational Therapy Aides	HSDoE	None		
Opticians, Dispensing	HSDoE	None	\$13.10	\$27,243
Orderlies	HSDoE	None	\$12.17	\$25,314
Pharmacy Aides	HSDoE	None	\$13.50	\$28,088
Pharmacy Aides	HSDoE	None	\$13.50	\$28,088
Pharmacy Technicians	HSDoE	None	\$15.15	\$31,506
Physical Therapist Aides	HSDoE	None	\$12.02	\$25,003
Physical Therapist Aides	HSDoE	None	\$12.02	\$25,003
Psychiatric Aides	HSDoE	None	\$12.62	\$26,259
Veterinary Assistants & Laboratory Animal Caretakers	HSDoE	None	\$10.40	\$21,635
Veterinary Assistants & Laboratory Animal Caretakers	HSDoE	None	\$10.40	\$21,635
Dental Assistants	PNDA	None	\$18.34	\$38,147
Dental Assistants	PNDA	None	\$18.34	\$38,147
Emergency Medical Technicians & Paramedics	PNDA	None	\$20.02	\$41,636
Licensed Practical & Licensed Vocational Nurses	PNDA	None	\$22.38	\$46,554
Massage Therapists	PNDA	None	\$18.67	\$38,832
Massage Therapists	PNDA	None	\$18.67	\$38,832
Medical Assistants	PNDA	None	\$14.61	\$30,380
Medical Assistants	PNDA	None	\$14.61	\$30,380
Medical Records & Health Information Technicians	PNDA	None	\$17.41	\$36,211
Medical Transcriptionists	PNDA	None	\$18.05	\$37,541
Medical Transcriptionists	PNDA	None	\$18.05	\$37,541
Nursing Assistants	PNDA	None	\$12.01	\$24,980
Ophthalmic Medical Technicians	PNDA	None	\$16.63	\$34,591
Phlebotomists	PNDA	None	\$14.61	\$30,388
Phlebotomists	PNDA	None	\$14.61	\$30,388
Psychiatric Technicians	PNDA	None	\$12.21	\$25,400
Surgical Technologists	PNDA	None	\$21.59	\$44,905
Cardiovascular Technologists & Technicians	AD	None	\$24.87	\$51,728
Dental Hygienists	AD	None	\$40.52	\$84,273
Diagnostic Medical Sonographers	AD	None	\$32.16	\$66,891
Dietetic Technicians	AD	None	\$16.43	\$34,177
Magnetic Resonance Imaging Technologists	AD	≤ 5 years	\$31.50	\$65,525
Medical & Clinical Laboratory Technicians	AD	None	\$18.80	\$39,106
Nuclear Medicine Technologists	AD	None	\$35.08	\$72,974
Occupational Therapy Assistants	AD	None	\$31.59	\$65,713
Occupational Therapy Assistants	AD	None	\$31.59	\$65,713
Physical Therapist Assistants	AD	None	\$31.77	\$66,076
Physical Therapist Assistants	AD	None	\$31.77	\$66,076
Radiation Therapists	AD	None		
Radiologic Technologists	AD	None	\$25.40	\$52,826
Registered Nurses	AD	None	\$31.44	\$65,394
Respiratory Therapists	AD	None	\$27.13	\$56,435
Respiratory Therapy Technicians	AD	None	\$22.50	\$46,792
Veterinary Technologists & Technicians	AD	None	\$13.46	\$28,007
Athletic Trainers	BD	None	NA	\$50,226
Dietitians & Nutritionists	BD	None	\$24.95	\$51,898
Exercise Physiologists	BD	None	\$21.53	\$44,785
Healthcare Practitioners & Technical Workers, All Other	BD	None	\$24.71	\$51,403
Medical & Clinical Laboratory Technologists	BD	None	\$25.71	\$53,476

LIFE SCIENCES & TECHNOLOGY INTEGRATION (CONTINUED)

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Occupational Health & Safety Specialists	BD	None	\$31.68	\$65,900
Recreational Therapists	BD	None	\$17.89	\$37,220
Therapists, All Other	BD	None	\$33.86	\$70,430
Health Diagnosing & Treating Practitioners, All Other	MD	None	\$28.15	\$58,558
Nurse Anesthetists	MD	None		
Nurse Midwives	MD	None	\$44.58	\$92,723
Nurse Practitioners	MD	None	\$38.65	\$80,397
Occupational Therapists	MD	None	\$34.65	\$72,082
Orthotists & Prosthetists	MD	None	\$24.33	\$50,609
Physician Assistants	MD	None	\$48.38	\$100,635
Speech-Language Pathologists	MD	None	\$30.70	\$63,851
Anesthesiologists	DoPD	None		
Audiologists	DoPD	None	\$31.03	\$64,534
Chiropractors	DoPD	None		
Dentists, All Other Specialists	DoPD	None		
Dentists, General	DoPD	None	\$79.44	\$165,236
Family & General Practitioners	DoPD	None	\$91.97	\$191,294
Internists, General	DoPD	None	\$120.86	\$251,387
Obstetricians & Gynecologists	DoPD	None	\$94.03	\$195,573
Optometrists	DoPD	None	\$59.28	\$123,310
Oral & Maxillofacial Surgeons	DoPD	None		
Orthodontists	DoPD	None		
Pediatricians, General	DoPD	None	\$94.35	\$196,245
Pharmacists	DoPD	None	\$55.65	\$115,746
Physical Therapists	DoPD	None	\$35.04	\$72,889
Physicians & Surgeons, All Other	DoPD	None	\$123.10	\$256,039
Podiatrists	DoPD	None		
Psychiatrists	DoPD	None	\$92.24	\$191,865
Surgeons	DoPD	None	\$121.31	\$252,328
Veterinarians	DoPD	None	\$50.65	\$105,355

MOBILITY INNOVATIONS

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Helpers--Production Workers	LTHS	None	\$11.16	\$23,204
Assemblers & Fabricators, All Other	HSDoE	None	\$17.40	\$36,201
Auto Body & Related Repairers	HSDoE	None	\$19.36	\$40,259
Auto Glass Installers & Repairers	HSDoE	None		
Auto Service Technicians & Mechanics	HSDoE	None	\$19.35	\$40,249
Coil Winders, Tapers, & Finishers	HSDoE	None		
Computer Numerically Controlled Machine Tool Programmers, Metal/Plastic	HSDoE	None	\$25.80	\$53,670
Computer-Controlled Machine Tool Operators, Metal/Plastic	HSDoE	None	\$14.17	\$29,481
Cutting, Punching, & Press Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$13.22	\$27,506
Electrical & Electronic Equipment Assemblers	HSDoE	None	\$14.57	\$30,304
Electromechanical Equipment Assemblers	HSDoE	None	\$17.53	\$36,456
Engine & Other Machine Assemblers	HSDoE	None		
Fiberglass Laminators & Fabricators	HSDoE	None		
First-Line Supervisors of Mechanics, Installers, & Repairers	HSDoE	≤ 5 years	\$30.15	\$62,718
Grinding, Lapping, Polishing, & Buffing Machine Tool Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$13.84	\$28,789
Industrial Machinery Mechanics	HSDoE	None	\$26.42	\$54,948
Lathe & Turning Machine Tool Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$18.76	\$39,014
Machinists	HSDoE	None	\$20.01	\$41,627
Milling & Planing Machine Setters, Operators, & Tenders, Metal/Plastic	HSDoE	None	\$20.15	\$41,918
Mobile Heavy Equipment Mechanics, Ex. Engines	HSDoE	None	\$19.49	\$40,549
Molders, Shapers, & Casters, Ex. Metal/Plastic	HSDoE	None		
Motorcycle Mechanics	HSDoE	None		
Production Workers, All Other	HSDoE	None	\$14.55	\$30,267
Structural Metal Fabricators & Fitters	HSDoE	None	\$15.89	\$33,058
Team Assemblers	HSDoE	None	\$12.52	\$26,052
Tire Builders	HSDoE	None		
Aircraft Mechanics & Service Technicians	PNDA	None	\$28.66	\$59,620
Electric Motor, Power Tool, & Related Repairers	PNDA	None	\$21.37	\$44,460
Electrical & Electronics Installers & Repairers, Transportation Equipment	PNDA	None	\$23.76	\$49,421
Electrical & Electronics Repairers, Commercial & Industrial Equipment	PNDA	None	\$23.37	\$48,618
Electrical & Electronics Repairers, Powerhouse, Substation, & Relay	PNDA	None		
Electronic Equipment Installers & Repairers, Motor Vehicles	PNDA	None	\$15.44	\$32,123
Aerospace Engineering & Operations Technicians	AD	None		
Avionics Technicians	AD	None		
Electrical & Electronics Engineering Technicians	AD	None	\$32.78	\$68,175
Electro-Mechanical Technicians	AD	None		
Engineering Technicians, Ex. Drafters, All Other	AD	None	\$27.55	\$57,310
Industrial Engineering Technicians	AD	None	\$29.14	\$60,616
Mechanical Engineering Technicians	AD	None	\$22.53	\$46,871
Aerospace Engineers	BD	None	\$44.18	\$91,895
Chemical Engineers	BD	None	\$57.08	\$118,733
Computer Hardware Engineers	BD	None	\$51.02	\$106,130
Computer Programmers	BD	None	\$41.52	\$86,372
Computer Systems Analysts	BD	None	\$37.19	\$77,350
Electrical Engineers	BD	None	\$52.86	\$109,948
Electronics Engineers, Ex. Computer	BD	None	\$49.52	\$102,992
Engineers, All Other	BD	None	\$48.06	\$99,956
Industrial Production Managers	BD	≥ 5 years	\$53.23	\$110,711
Materials Engineers	BD	None	\$42.03	\$87,430
Mechanical Engineers	BD	None	\$44.77	\$93,118
Nuclear Engineers	BD	None		
Petroleum Engineers	BD	None	\$76.75	\$159,638
Software Developers, Applications	BD	None	\$45.12	\$93,856
Software Developers, Systems Software	BD	None	\$49.10	\$102,124

ZERO WASTE

Occupational Title	Typical Education needed for Entry into Occupation	Work Experience in a related Occupation	Hourly Wage 2014	Annual Wage 2014
Industrial Truck & Tractor Operators	LTHS	None	\$13.99	\$29,097
Laborers & Freight, Stock, & Material Movers, Hand	LTHS	None	\$12.13	\$25,228
Machine Feeders & Offbearers	LTHS	None		
Material Moving Workers, All Other	LTHS	None		
Packers & Packagers, Hand	LTHS	None	\$11.59	\$24,106
Refuse & Recyclable Material Collectors	LTHS	None	\$15.46	\$32,157
Stock Clerks & Order Fillers	LTHS	None	\$12.82	\$26,660
Cargo & Freight Agents	HSDoE	None	\$18.97	\$39,457
Machinists	HSDoE	None	\$20.01	\$41,627
Production, Planning, & Expediting Clerks	HSDoE	None	\$23.11	\$48,078
Separating, Filtering, Clarifying, Precipitating, & Still Machine Setters, Operators, & Tenders	HSDoE	None	\$18.85	\$39,213
Shipping, Receiving, & Traffic Clerks	HSDoE	None	\$13.79	\$28,685
Tool & Die Makers	HSDoE	None		
Weighers, Measurers, Checkers, & Samplers, Recordkeeping	HSDoE	None	\$10.95	\$22,774
Welders, Cutters, Solderers, & Brazers	HSDoE	None	\$17.88	\$37,181
Agricultural & Food Science Technicians	AD	None		
Chemical Technicians	AD	None	\$18.51	\$38,511
Electro-Mechanical Technicians	AD	None		
Environmental Engineering Technicians	AD	None	\$26.64	\$55,417
Biomedical Engineers	BD	None	\$49.83	\$103,641
Chemical Engineers	BD	None	\$57.08	\$118,733
Chemists	BD	None	\$30.11	\$62,626
Conservation Scientists	BD	None	\$26.66	\$55,456
Environmental Scientists & Specialists, Inc. Health	BD	None	\$29.72	\$61,824
Food Scientists & Technologists	BD	None		
Foresters	BD	None		
Geoscientists, Ex. Hydrologists & Geographers	BD	None	\$40.43	\$84,091
Life Scientists, All Other	BD	None		
Logisticians	BD	None	\$42.58	\$88,563
Materials Engineers	BD	None	\$42.03	\$87,430
Materials Scientists	BD	None	\$39.73	\$82,648
Microbiologists	BD	None	\$22.95	\$47,743
Soil & Plant Scientists	BD	None		
Zoologists & Wildlife Biologists	BD	None	\$29.72	\$61,818
Hydrologists	MD	None	\$30.70	\$63,858
Biochemists & Biophysicists	DoPD	None	\$33.09	\$68,824

Endnotes

¹ *Pursuing and Industry Cluster Approach to Economic Development: What That Means, Why it Matters, and How it Impacts Workforce Development Policy*, Texas Workforce Commission, September 15, 2005, 11.

² *Greater Austin Texas, Target Business Review: Opportunity Austin 2.0*, Market Street, June 14, 2007, 4.

³ U.S. Metro Economies: GMP and Employment 2013-2015, The United States Conference of Mayors, June 2014, 2.

⁴ Richard Florida and Charlotta Mellander. *Insight: Segregated City*, Martin Prosperity Institute. February 23, 2015.

⁵ *Affordable Austin: Building the Housing We Need at Prices We Can Afford*, Real Estate Council of Austin, January 14, 2015, 1.

⁶ A Target Market is one that has been evaluated in the context of national performance over both the short term and the next ten years; has been reviewed in the scope of the regional economy and related clusters; has been evaluated against the region's competitors and comparative advantages; and, is consistent with Austin's values and vision for its economy as determined by community and stakeholder sentiment.

⁷ For the purposes of this report, middle-skill jobs include an associate's degree; postsecondary non-degree (1-2 year certificate); some college, no degree; apprenticeship; and long-term on-the-job training (1 year or more; often combined with classroom instruction).

⁸ *Job Polarization and the decline of middle-class work*, Michael Boehm, February 8th 2014, www.voxeu.org

⁹ 2010-2014 American Community Survey 5-Year Estimates, Educational Attainment by Employment Status for the Population 25 to 64 Years - Universe: Population 25 to 64 years.

¹⁰ Appendix Item A provides an estimate of the underutilized population in the City of Austin using census-share methodology and unemployment figures from the Bureau of Labor Statistics for March 2015. This following information highlights a few segments of Austin's labor force that has potential to realize sustainable occupational attainment while fulfilling the City's goal of expanding the middle class. One should note, however, that this list is not exhaustive; and, industry development needs to be paired with vocational training, encouragement of STEM (Science, Technology, Engineering, & Math) in underrepresented youth populations, and strategic place-based site selection of business if social mobility is to gain momentum in Austin.

¹¹ *Greater Austin Texas, Target Business Review: Opportunity Austin 2.0*, Market Street, June 14, 2007, 4, 27.

¹² Greater Austin Chamber of Commerce

¹³ U.S. Bureau of Labor Statistics

¹⁴ *Manufacturing Impact in Central Texas*, Civic Analytics, October 22, 2015

¹⁵ Ibid.

¹⁶ Living wage for one adult in Austin is \$10.97 per hour, according to the MIT Living Wage Calculator

¹⁷ *Logistics & Distribution in Austin: Status and Opportunity*, TXP, Winter 2015, 1.

¹⁸ Ibid., 9.

¹⁹ Ibid., 11.

²⁰ Texas Workforce Commission, Capital Area WDA, Occupational Projections

²¹ 2010-2014 American Community Survey 5-Year Estimates, Educational Attainment by Employment Status for the Population 25 to 64 Years - Universe: Population 25 to 64 years. Ratio of individuals that have not completed high school that are unemployed and population not in the labor force to total individuals that have not completed high school.

²² Ibid., 8.

²³ Ibid., 21.

²⁴ *The Role of Innovation Workforce & Creative Sector in the Texas Economy*, TXP, January 2009, 28.

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- ²⁵ *2012 TXP Economic Impact of the Creative Sector in Austin*, TXP, Febraury 2012, 2.
- ²⁶ *Ibid.*, 6.
- ²⁷ *Greater Austin Texas, Target Business Review: Opportunity Austin 2.0*, Market Street, June 14, 2007, 39.
- ²⁸ *Ibid.*, 39.
- ²⁹ Austin Music Census, Titan Music Group, June 1, 2015, 56, 57.
- ³⁰ The Austin Music Census, Titan Music Group, LLC, June 1, 2015, 52.
- ³¹ *Ibid.*, 5.
- ³² *2012 TXP Economic Impact of the Creative Sector in Austin*, TXP, Febraury 2012, 19
- ³³ *The Fashion & Apparel Industries in Austin*, TXP, Spring 2015, 2.
- ³⁴ *Ibid.*, 3.
- ³⁵ *The Wearable Future*, PWC, October 2014, 19.
- ³⁶ *Smart Textiles Market Analysis and Segment Forecasts to 2020*, Gran View Research, January 2014.
- ³⁷ Kansara, V. (2014, November 30). Amanda Parkes on Why Wearable Tech is About More Than Gadgets. Retrieved February 28, 2015, from <http://www.businessoffashion.com/2014/11/amanda-parkes-wearable-tech-gadgets.html>
- ³⁸ *The Fashion & Apparel Industries in Austin*, TXP, Spring 2015, 17.
- ³⁹ *The Fashion & Apparel Industries in Austin*, TXP, Spring 2015, 11.
- ⁴⁰ *Ibid.*, 2.
- ⁴¹ *Ibid.*, 12
- ⁴² Swiatecki, C. (2015, January 27). Austin's arts sector a \$443M economic engine annually. *Austin Business Journal*. April 30, 2015
- ⁴³ *The Fashion & Apparel Industries in Austin*, TXP, Spring 2015, 2.
- ⁴⁴ *Ibid.*, 13
- ⁴⁵ *Local & Regional Food Systems*, Grace Communications Foundations, <<http://www.gracelinks.org>>
- ⁴⁶ Trends in U.S. Local and Regional Food Systems, United States Department of Agriculture, January 2015, 1.
- ⁴⁷ *State of the Food System Report*, Office of Sustainability, City of Austin, April 2015, 11.
- ⁴⁸ *Austin Food Sector Economic Impact*, TXP, Spring 20132, 21
- ⁴⁹ Texas Workforce Commission, Capital Area Workforce Development Long-term Occupational Projections
- ⁵⁰ *Ibid.*, 14.
- ⁵¹ *Ibid.*, 60.
- ⁵² *Ibid.*, 60.
- ⁵³ Greater Austin Chamber of Commerce, <<http://www.austinchamber.com/site-selection/key-industries/life-science>>
- ⁵⁴ *Life Sciences Economic Impact*; Austin Technology Council & Civic Analytics, 2014
- ⁵⁵ City of Austin: Value Proposition, Texas A&M University, 2012, 48,49.
- ⁵⁶ EMSI. Data is for 2013.
- ⁵⁷ *Greater Austin Texas, Target Business Review: Opportunity Austin 2.0*, Market Street, June 14, 2007, 65.
- ⁵⁸ *Ibid.*, 65.
- ⁵⁹ Garza, V. (2012, August 23). Report: Austin medical school will have \$2B economic impact. *Austin Business Journal*. Retrieved April 28, 2015, from <http://www.bizjournals.com/austin/news/2012/08/23/report-medical-school-will-have-2b.html>
- ⁶⁰ Greater Austin Space Economy Task Force
- ⁶¹ *Ibid.*
- ⁶² Greater Austin Chamber of Commerce

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- ⁶³ *Economic Impact of the Cleantech Sector*, CleanTX, Civic Analytics, ATI, May 2015, 4.
- ⁶⁴ *Austin Resource Recover Master Plan*, Austin Resource Recovery, December 15, 2011, 2.
- ⁶⁵ *Waste to Wealth: Recycling Means Business*, Institute for Local Self-Reliance, December 10, 2008, <<http://www.ilsr.org/recycling/recyclingmeansbusiness.html>>
- ⁶⁶ *The Current and Potential Economic Impacts of Austin Recycling - and Reuse-Related Activity*, TXP, May 2015, 22.
- ⁶⁷ Texas Workforce Commission, Capital Area Workforce Development Long-term Occupational Projections
- ⁶⁸ *The Current and Potential Economic Impacts of Austin Recycling - and Reuse-Related Activity*, TXP, May 2015, 23.
- ⁶⁹ *Austin Resource Recovery Master Plan*, Austin Resource Recover, December 15, 2011, page 34.
- ⁷⁰ *Ibid.*, 34.
- ⁷¹ *The Current and Potential Economic Impacts of Austin Recycling - and Reuse-Related Activity*, TXP, May 2015, 1.
- ⁷² *Austin Zero Waste Strategic Plan*, Austin Resource Recover December 4, 2008, page 6.