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TENNESSEE
Ready to Work

2013 LEAP Report

TENNESSEE DEPARTMENT OF ECONOMIC & COMMUNITY DEVELOPMENT

2013 LEAP Report

In 2013, the Tennessee General Assembly adopted Public Chapter 338 which established a Labor Education Alignment Program (LEAP). The Act encourages the creation of LEAP programs by Tennessee Board of Regents' community colleges and colleges of applied technology. LEAP programs provide students the opportunity to combine occupational training in a high-skill or high-technology industry with academic credit and apply that combined work and academic experience towards acquiring an industry-recognized post-secondary credential. Educational programs under this grant would include occupational skills training, basic skills/workforce readiness training, as well as career preparation and guidance. The Act created the Workforce Advanced Training Fund in the Tennessee Department of Economic and Community Development.

Pursuant to Section 10 of Public Chapter 338, The Department of Economic and Community Development (ECD) must submit a report to partner agencies on demonstrated workforce needs within existing and prospective businesses where the department has conducted project activity. The following report will provide a summation of projects landed since 2011, noting where the project activity has occurred state-wide, the number of jobs those projects represent, the human capital skills required and the forecast of open, un-filled positions to date.

Tennessee is highly competitive in the global marketplace due largely from cultivating a business-friendly economic development stance. For instance, since the arrival of auto manufacturers in the state, every governor has made an active effort to expand the state's automotive industry and cumulatively they have attracted over $30 billion in private capital investment.

Jobs4TN, created by Governor Haslam to make Tennessee the No. 1 location in the Southeast for high quality jobs, has placed a priority on existing businesses and key industry clusters as the main thrusts for ECD's economic development work. He also instituted a decentralized, region-oriented economic development strategy designed to catalyze "bottom-up" economic growth within nine regional jobs base camps.

In summer 2012, the Haslam administration, with the Department of Economic and Community Development serving as point agency, accepted an offer from the Brookings Metropolitan Policy Program to develop a roadmap for advancing the Tennessee auto manufacturing sector, a classic "advanced industry (AI)." Through its Advanced Industries series, Brookings seeks to highlight the critical importance of R&D- and STEM-worker intensive industries to regional and national economic growth.

The Metropolitan Policy Program at Brookings defines advanced industries as those characterized by both a high STEM-skilled workforce and above-average R&D intensity. According to the commissioned report by Brookings entitled *"DRIVE! Moving Tennessee's Automotive Sector Up The Value Chain"*, in Tennessee, auto manufacturing dominates the super-sector and employs 42,600 Tennesseans—more than one-third of the state's AI total. However, other AIs also contribute significantly to the state's prosperity. Management, scientific, and technical consulting is a significant industry in Tennessee, as are computer systems design and medical equipment manufacturing. Together, these three advanced industries employ over 38,000 Tennessee workers. They also contribute inordinately to the state's economy: Altogether, the AI sector in Tennessee is a $21.3 billion group of industries, responsible for 9 percent of the state's output though it employs just 4.5 percent of its workforce.

If advanced industries anchor the Tennessee economy, the iconic automotive industry resides at its center. Currently, the auto sector accounts for over a third of all Tennessee jobs in "advanced" R&D and STEM-knowledge-intensive industries—a crucial swath of industries that ranges from pharmaceuticals and medical devices to aerospace manufacturing, software, and telecommunications.

The data show that the auto industry anchors the state's critical advanced industries sector. Composed of multiple industries each characterized by high R&D intensity and a high concentration of STEM workers engaged in technology

deployment, the AI sector drives innovation and economic development in the United States. DRIVE! indicated that in Tennessee, the AI sector currently employs only 4.5 percent of the state's workers but generates 10.9 percent of state output. AIs also led the state out of the recession. These innovation-intensive industries added jobs at an average rate of 4.4 percent each year from 2010 to 2012, compared to 1.8 percent for the economy as a whole. At the same time, the value of AI production increased by 5.3 percent on average annually, more than double the rate of statewide output expansion.

From the Brookings report, we know that the automotive industry itself, meanwhile, employs one-third of all workers in the state's AI sector—more than any other industry—and generates more output than any other AI as well. What is more, the automotive industry has been the prime driver of the AI sector's employment recovery. While employment in the AI sector overall increased at a rate of 4.4 percent annually between 2010 and 2012, the two portions of the automotive industry that qualify as "advanced"—motor vehicle manufacturing and motor vehicle parts manufacturing—saw employment grow at average annual rates of 12.5 percent and 9.5 percent, respectively. With these rapid expansions, the automotive industry has been responsible for more than half of all new job creation in Tennessee's AI sector post-recession.

In the broader manufacturing sector, the automotive industry alone has accounted for 85 percent of job growth since 2010. Across the entire economy, meanwhile, the automotive industry—employing just 1.7 percent of the state's workforce—has created over 12 percent of all new jobs in Tennessee since 2010.4 Similarly, in terms of output the automotive industry has generated 36 percent of the Tennessee manufacturing sector's output growth since 2010 and nearly 85 percent since output hit bottom in 2009 (nationally and in Tennessee output reached its low point one year before employment did). Economy-wide, the automotive industry alone accounts for 13 percent of Tennessee's production increases since 2010 and 20 percent since 2009. The automotive industry, in short, punches far above its weight in the state's portfolio of advanced industries and represents a critical component of the state's productive sector and innovation enterprise.

DRIVE! also notes that the productivity imperative requires a uniquely trained and agile workforce. Industry dynamics are driving sharp new demands for productivity that are making new demands on Tennessee's workforce. The knowledge economy must be addressed for Tennessee to remain competitive for both existing industry expansions as well as targeted sector recruitment pursuits.

As OEMs reduce platforms and lead time and components become more integrated and complex, North American producers will only be able to maintain their margins by improving productivity through the constant deployment of new techniques, processes, and equipment. This, in turn, will require a shift in the composition of high-skilled workforce demand toward workers who are competent at varied tasks, comfortable with technology, and able to remain as flexible as R&D progress demands. Going forward, interdisciplinary training will be far more important than academic concentration. According to a survey noted by DRIVE! And conducted by Deloitte, manufacturers believe that access to a highly skilled and adaptive workforce is the most important challenge facing their firms within the next five to 10 years.

Addressing the lack of skilled workers will require greater strategic coordination between public educational institutions, industry and private training programs as well as a move by postsecondary engineering programs to de-silo traditional mechanical, electrical, and chemical engineering departments.

Excerpt from Brookings' DRIVE!

"There is confirmed acknowledgement that Tennessee's "skills gap" or "worker shortage" exists. Manufacturing employers in Tennessee and across the nation persistently report difficulty in finding appropriately trained workers qualified to fill open positions. Meanwhile, other voices argue against the idea of a skills gap and instead point—amid high unemployment rates—to low wages and limited industry investment in skills development as the cause of most labor market challenges.

One indication that up-skilling may be causing labor market strains can be found in Brookings' analysis of 2012 online job advertisements in Tennessee as aggregated by the Conference Board's Help Wanted On-Line data series. (See Appendix A

in DRIVE! for a full explanation of the Brookings methodology.) This analysis shows that most of the hard-to-fill occupations in the production and maintenance cluster call for some level of postsecondary education or moderate- to long-term on-the-job training, while the jobs least difficult to fill in this occupational cluster overwhelmingly require only a high school diploma. ("Hard-to-fill" jobs are those re-posted at least once after the original posting, which suggests that employers need more time to find the right candidates.) What is more, online job postings suggest that jobs in some auto-specialized occupations are proving particularly hard to fill. For example, 47 percent of auto-specialized maintenance job openings (including positions such as industrial machinery mechanics and electronics repairers) are listed longer than one month, compared to 39 percent of all maintenance occupations, an indication that auto-manufacturing employers require additional time in order to find suitable workers."

Tennessee employers struggle to fill positions across a variety of occupations in the automotive industry

Hard-to-Fill Production & Maintenance Occupations	Hard-to-Fill Engineering & Design Occupations	Hard-to-Fill Managerial, Business, & Operations Occupations
First-Line Supervisors, Production Workers	Industrial Engineers	Purchasing Agents
First-Line Supervisors, Mechanics & Installers	Mechanical Engineers	Production, Planning, & Expediting Clerks
Industrial Machinery Mechanics	Electrical Engineers	Architectural & Engineering Managers
Machinists	Operations Research Analysts	Purchasing Managers
Welders, Cutters, Solderers, & Brazers	Industrial Engineering Technicians	Logisticians
Computer-Controlled Machine Tool Operators	Health & Safety Engineers	Industrial Production Managers
Tool & Die Makers	Engineers, All Other	Occupational Health & Safety Specialists
Industrial Electrical Repairers	Mechanical Drafters	
CNC Machine Tool Programmers	Materials Engineers	
Model Makers, Metal & Plastic	Electro-Mechanical Technicians	
	Commercial & Industrial Designers	

Source: Brookings analysis of data from BLS Occupation Employment Statistics, BLS Industry Occupation Matrix, and the Conference Board's Help Wanted OnLine database

"Southern workers in the production and maintenance and engineering and design occupational clusters are all older than the average U.S. worker, with just 20 percent of such workers under age 35 and roughly 60 percent between the ages of 35 and 55. By contrast, one-third of all workers in the United States are under the age of 35, and 46 percent are between the ages of 35 and 55.[52] These demographic trends raise concerns about the impact of successive waves of retirements in the years ahead, especially in engineering and managerial occupations.

Hiring in the Tennessee auto sector—as in other advanced industries—is complicated by the fact that the industry is in transition. The state has to date primarily focused on meeting the needs of OEMs and other large firms while paying less attention to the needs of the state's hundreds of SMEs, which are less able to dedicate resources to workforce training and development.

However, it's now time to get to work and begin to build a truly state-of-the-art workforce development system—one that is, like the best systems, regionally based, industry-focused, and performance-driven. Ideally the new system will focus on devising high-quality multi-employer training programs rather than single-employer one-offs."

Tennessee Statewide – Top Jobs Analysis

The ECD Research Division has conducted analysis on the Tennessee clusters' occupational employment providing THEC and TDLWD with current workforce development and staffing needs. The following methodology was utilized to procure data reflecting top-level state occupation volumes and opportunities.

Methodology: Identified "top jobs" (high employment occupations) for Tennessee's clusters through analysis of top 25 occupations (by employment) for each industry associated with Tennessee's clusters.

- Goal: Identify occupations important to Tennessee's clusters. ("top" jobs)
- Study provides analysis of 19 industries across 7 clusters defined below for the purposes of this study:

Cluster Definitions for Purposes of Analysis	
Cluster	**NAICS Codes**
Automotive Manufacturing	3361 - Motor Vehicle Manufacturing
	3362 - Motor Vehicle Body and Trailer Manufacturing
	3363 - Motor Vehicle Parts Manufacturing
Chemicals, and Plastics & Rubber Products Manufacturing	325 - Chemical Manufacturing
	326 - Plastics and Rubber Products Manufacturing
Food & Agribusiness	311 - Food Manufacturing
	3121 - Beverage Manufacturing
Logistics, Transportation and Distribution	42 - Wholesale Trade
	482 - Rail Transportation
	484 - Truck Transportation
	488 - Support Activities for Transportation
	492 - Couriers and Messengers
	493 - Warehousing and Storage
Aerospace Manufacturing	3364 - Aerospace Product and Parts Manufacturing
Healthcare and Medical Devices	3345 (selected occupations) - Navigational, Measuring, Electromedical, and Control Instruments Manufacturing
	3391 - Medical Equipment and Supplies Manufacturing
Business Services (HQ, Datacenters, Call Centers)	5511 - Management of Companies and Enterprises
	5614 - Business Support Services
	5182 - Data Processing, Hosting, and Related Services

- ECD Research determined top 25 occupations by employment for each of 19 industries utilizing the Occupational Employment Statistics (OES) program of the Bureau of Labor Statistics. National industry-specific occupational employment estimates for 2012 were utilized to determine "top" jobs for an industry.
- Comparison of "top" jobs across clusters allowed for identification of occupations which were important to multiple clusters (cross-cluster "top" jobs) and to a single cluster.
- For each occupation, indicators were collected for Tennessee utilizing EMSI Economic Modeling. The EMSI model incorporates data from the Bureau of Economic Analysis (BEA), Bureau of Labor Statistics (BLS), and National Center for Education Statistics (NCES).

Metric	Metric Description
2013 Jobs	Tennessee employment for an occupation. Employment estimates are not specific to an industry or cluster. *EMSI source: Bureau of Labor Statistics*
Change in Jobs (2011-2013)	Tennessee's change in employment for an occupation from 2011-2013. *EMSI source: Bureau of Labor Statistics*
% Change in Jobs (2011-2013)	Tennessee's percent change in employment for an occupation from 2011-2013. *EMSI source: Bureau of Labor Statistics*
2013 National Location Quotient	Compares percent employment in Tennessee to percent employment in the nation. A location quotient of 1.0 means that percent employment for Tennessee matches the nation. As a relative measure of concentration, location quotient is very useful for identifying key regional occupations. An occupation with a high location quotient contributes to the uniqueness of a region, and is often associated with a key industry or sector. *Source: EMSI's proprietary employment data.*
Average Hourly Earnings	Tennessee average hourly wage by occupation. *Source: EMSI's proprietary employment data, relying heavily on occupational earnings reported in OES*.
Annual Openings	Estimated annual employment change and turnover in Tennessee for an occupation for the selected timeframe (2011-2013). This is EMSI's estimate of labor market demand for an occupation. *EMSI source: EMSI's proprietary employment data*
Regional Completions (2012)	All completions for programs associated with an occupation and offered by institutions falling within Tennessee. *EMSI source: Integrated Postsecondary Education Data System (IPEDS), National Center for Education Statistics (NCES)*
Education Level	The most significant source of education or training for an occupation. Combines typical education, experience, and on-the-job training held by workers in this field. *EMSI source: Bureau of Labor Statistics*

Findings

Cross-Cluster "Top" Jobs

- 62 occupations were identified as "top" occupations in more than one cluster.
- General and Operations Managers (SOC 11-1021) was the only occupation that was a "top" occupation in all 7 clusters. This occupation has 1,162 annual openings across Tennessee – and the most significant source of education/training is identified a Bachelor's Degree or Higher, plus work experience. Completions in 2012 totaled 6,029.

Associated Clusters	Number of Occupations
7	1
6	6
5	5
4	7
3	11
2	32

- For 17 of the 62 (24%) cross-cluster "top" jobs, postsecondary education is the most significant source of education or training.

- Of these 17 occupations, 2012 completions in three occupations were lower than the annual level of openings. These three occupations, in addition to other notable occupations with low completions relative to openings, are included in the table below:

# Clusters	Clusters	SOC	Occ.	2013 Jobs	Change in Jobs (2011-2013)	% Change in Jobs (2011-2013)	2013 National Location Quotient	Annual Openings	Avg. Hourly Earnings	Regional Completions (2012)	Education Level
2	D, M	41-4011	Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	10,598	583	6.0%	1.29	539	38.53	304	Bachelor's degree
4	Ae, Au, C, M	17-2112	Industrial Engineers	4,962	345	7.0%	1.09	280	37.3	83	Bachelor's degree
2	Au, D	51-4121	Welders, Cutters, Solderers, and Brazers	8,212	572	7.0%	1.1	531	16.38	475	Postsecondary non-degree award
2	B, M	13-2011	Accountants and Auditors	23,715	1,412	6.0%	0.89	1207	29.78	1278	Bachelor's degree
2	Ae, M	17-2071	Electrical Engineers	2,576	127	5.0%	0.77	126	41.52	267	Bachelor's degree
3	Ae, Au, M	17-2141	Mechanical Engineers	4,589	206	5.0%	0.87	250	38.3	403	Bachelor's degree

- Based on 2013 location quotients, 25 of the 62 (40%) cross-cluster, high-employment occupations were identified as occupations for which Tennessee's percentage employment is below the national average. Focusing resources on these occupations would increase Tennessee's competitiveness for occupations which are key to several of Tennessee's clusters. ***(See Table 1)***
  - Postsecondary education is the most significant source of education/training for 11 of these occupations (highlighted in Table 1).

High-Employment Occupations within *One* Cluster (specialization)

- 96 occupations were identified as high-employment for **one** of Tennessee's seven identified clusters.
- The most significant source of education or training for 30 of these 96 (31%) occupations is postsecondary education.
  - Of these 30 jobs, annual openings were lower than 2012 regional completions for four occupations. The four occupations, along with other jobs with low completions relative to openings, are included in the table below:

Cluster	SOC	Occupation	2013 Jobs	Change in Jobs (2011-2013)	% Change in Jobs (2011-2013)	2013 National Location Quotient	Annual Openings	Avg. Hourly Earnings	Regional Completions (2012)	Education Level
Business Services	13-1071	Human Resources Specialists	6828	368	6.0%	0.78	303	25.63	226	Bachelor's degree
Logistics, Distribution, Transp.	53-5021	Captains, Mates, and Pilots of Water Vessels	739	34	5.0%	0.99	66	43.04	0	Bachelor's degree
Logistics, Distribution, Transp.	49-3031	Bus and Truck Mechanics and Diesel Engine Specialists	5345	147	3.0%	1.06	194	18.61	157	Postsecondary non-degree award
Business Services	13-1151	Training and Development Specialists	4677	258	6.0%	0.99	207	29.15	171	Bachelor's degree
Aero. Mfg.	17-2011	Aerospace Engineers	326	6	2.0%	0.19	18	42.32	48	Bachelor's degree
Healthcare & Medical Devices	17-2061	Computer Hardware Engineers	566	33	6.0%	0.34	31	39.45	66	Bachelor's degree
Healthcare & Medical Devices	17-2031	Biomedical Engineers	360	32	10.0%	0.84	24	41.25	124	Bachelor's degree
Chemical, Plastics, Rubber	19-4031	Chemical Technicians	1404	36	3.0%	1.1	38	21.14	152	Associate's degree

Chemical, Plastics, Rubber	17-2041	Chemical Engineers	751	11	1.0%	1.12	31	43.51	149	Bachelor's degree
Aero. Mfg.	49-2091	Avionics Technicians	207	27	15.0%	0.59	19	25.92	170	Postsecondary non-degree award
Logistics, Distribution, Transp.	49-9097	Signal and Track Switch Repairers	157	-2	-1.0%	0.84	5	25.39	181	Postsecondary non-degree award
Business Services	13-1161	Market Research Analysts and Marketing Specialists	6328	556	10.0%	0.71	443	26.78	634	Bachelor's degree

- Based on 2013 location quotients, 54 of the 96 (56%) single-cluster, high-employment occupations were identified as occupations for which Tennessee's percentage employment is below the national average. ***(See Table 2)***
    - Postsecondary education is the primary source of education for 22 of these occupations in Tennessee (highlighted in Table 2).

Table 1: Cross-cluster, High-Employment Occupations with a 2013 National Location Quotient Below 1

# Associated Clusters	Associated Clusters*	SOC	Occ.	2013 Jobs	Change in Jobs (2011-2013)	% Change in Jobs (2011-2013)	2013 National Location Quotient	Annual Openings	Avg. Hourly Earnings	Regional Completions (2012)	Education Level
3	Ae, B, M	15-1133	Software Developers, Systems Software	2993	234	8.0%	0.35	150	$ 38.66	683	Bachelor's degree
3	Ae, B, M	15-1132	Software Developers, Applications	5453	343	7.0%	0.43	232	$ 37.44	640	Bachelor's degree
2	B, D	15-1151	Computer User Support Specialists	8016	387	5.0%	0.66	402	$ 21.46	883	Associate's degree
3	Ae, B, D	13-1199	Business Operations Specialists, All Other	13215	132	1.0%	0.67	338	$ 28.82	303	Long-term on-the-job training
3	Au, B, D	13-1111	Management Analysts	10052	384	4.0%	0.68	377	$ 35.86	5738	Bachelor's or higher degree, plus work experience
2	Ae, M	11 9041	Architectural and Engineering Managers	2667	89	3.0%	0.68	96	$ 50.43	1925	Bachelor's or higher degree, plus work experience
2	D, F	53-7061	Cleaners of Vehicles and Equipment	4956	98	2.0%	0.72	212	$ 10.26	0	Short-term on-the-job training
2	C, F	51-9012	Separating, Filtering, Clarifying, Precipitating, and Still Machine Setters, Operators, and Tenders	639	54	9.0%	0.73	37	$ 19.41	0	Moderate-term on-the-job training
3	Ae, Au, M	13-1023	Purchasing Agents, Except Wholesale, Retail, and Farm Products	4,544	125	3.0%	0.76	185	$ 26.47	2	Long-term on-the-job training
2	Ae, M	17-2071	Electrical Engineers	2576	127	5.0%	0.77	126	$ 41.52	267	Bachelor's degree
3	Ae, Au, M	51-2022	Electrical and Electronic Equipment Assemblers	3,098	276	10.0%	0.78	182	$ 13.27	73	Short-term on-the-job training
2	B, M	11 3021	Computer and Information Systems Managers	5314	259	5.0%	0.79	211	$ 49.04	1159	Bachelor's or higher degree, plus work experience
2	Ae, D	49-3011	Aircraft Mechanics and Service Technicians	2000	-102	-5.0%	0.8	61	$ 30.66	363	Postsecondary non-degree award
5	Au, B, C, D, F	41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	25,596	587	2.0%	0.83	897	$ 27.38	350	Moderate-term on-the-job training
2	B, D	41-2021	Counter and Rental Clerks	7446	261	4.0%	0.83	303	$ 12.39	1	Short-term on-the-job training
2	B, D	41-3099	Sales Representatives, Services, All Other	13515	667	5.0%	0.84	734	$ 24.03	304	Short-term on-the-job training
2	Ae, B	15-1121	Computer Systems Analysts	9138	485	6.0%	0.86	420	$ 35.10	1045	Bachelor's degree
3	Ae, Au, M	17-2141	Mechanical Engineers	4,589	206	5.0%	0.87	250	$ 38.30	403	Bachelor's degree
2	Au, C	51-4072	Molding, Coremaking, and Casting Machine Setters, Operators, and Tenders, Metal and Plastic	2,208	61	3.0%	0.87	67	$ 13.53	0	Moderate-term on-the-job training
2	B, M	13-2011	Accountants and Auditors	23715	1412	6.0%	0.89	1207	$ 29.78	1278	Bachelor's degree
2	B, D	11 9199	Managers, All Other	12082	55	0.0%	0.90	332	$ 26.28	6911	Work experience in a related occupation

4	B, D, F, M	43-3031	Bookkeeping, Accounting, and Auditing Clerks	33624	1193	4.0%	0.91	963	$ 16.09	136	Moderate-term on-the-job training
3	Ae, Au, M	51-4011	Computer-Controlled Machine Tool Operators, Metal and Plastic	2,647	202	8.0%	0.91	151	$ 15.59	230	Moderate-term on-the-job training
2	B, D	43-6014	Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	47333	181	0.0%	0.93	772	$ 14.06	240	Short-term on-the-job training
2	D, F	41-2031	Retail Salespersons	91838	6849	8.0%	0.99	6089	$ 11.72	3	Short-term on-the-job training

* Clusters are abbreviated as follows:

Ae: Aerospace Manufacturing
Au: Automotive Manufacturing
B: Business Services (HQ, Datacenters, Call Centers)
C: Chemicals, and Plastics and Rubber Products Manufacturing
D: Logistics, Transportation and Distribution
F: Food and Agribusiness
M: Healthcare and Medical Devices

Table 2: Single-cluster, High-Employment Occupations with a 2013 National Location Quotient Below 1

Cluster	SOC	Occupation	2013 Jobs	Change in Jobs (2011-2013)	% Change in Jobs (2011-2013)	2013 National Location Quotient	Annual Openings	Avg. Hourly Earnings	Regional Completions (2012)	Education Level
Food	51-3023	Slaughterers and Meat Packers	158	-28	-15.0%	0.10	18	$ 9.39	0	Moderate-term on-the-job training
Aero. Mfg.	17-2011	Aerospace Engineers	326	6	2.0%	0.19	18	$ 42.32	48	Bachelor's degree
Healthcare & Medical Devices	17-2061	Computer Hardware Engineers	566	33	6.0%	0.34	31	$ 39.45	66	Bachelor's degree
Food	45-2092	Farmworkers and Laborers, Crop, Nursery, and Greenhouse	5883	46	1.0%	0.39	205	$ 10.75	0	Short-term on-the-job training
Aero. Mfg.	51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	326	63	24.0%	0.39	38	$ 21.80	446	Moderate-term on-the-job training
Healthcare & Medical Devices	17-2072	Electronics Engineers, Except Computer	1,287	14	1.0%	0.45	49	$ 38.38	267	Bachelor's degree
Business Services	43-9071	Office Machine Operators, Except Computer	680	-19	-3.0%	0.49	24	$ 13.54	15	Short-term on-the-job training
Aero. Mfg.	13-1081	Logisticians	1302	96	8.0%	0.50	73	$ 31.30	404	Bachelor's degree
Business Services	15-1143	Computer Network Architects	1,541	50	3.0%	0.52	52	$ 39.09	1,696	Bachelor's degree
Logistics, Distribution, Transp.	53-7121	Tank Car, Truck, and Ship Loaders	140	5	4.0%	0.53	7	$ 15.95	0	Short-term on-the-job training
Business Services	13-2051	Financial Analysts	2,839	159	6.0%	0.54	145	$ 37.21	632	Bachelor's degree
Business Services	15-1199	Computer Occupations, All Other	2,278	-14	-1.0%	0.56	50	$ 31.64	792	Bachelor's degree
Chemical, Plastics, Rubber	19-2031	Chemists	1025	3	0.0%	0.58	47	$ 34.40	451	Bachelor's degree
Aero. Mfg.	49-2091	Avionics Technicians	207	27	15.0%	0.59	19	$ 25.92	170	Postsecondary non-degree award
Healthcare & Medical Devices	51-2023	Electromechanical Equipment Assemblers	620	32	5.0%	0.60	27	$ 15.03	7	Short-term on-the-job training
Business Services	15-1134	Web Developers	1,731	67	4.0%	0.62	63	$ 23.31	1,696	Bachelor's degree
Food	49-9091	Coin, Vending, and Amusement Machine Servicers and Repairers	527	-21	-4.0%	0.63	19	$ 14.66	0	Short-term on-the-job training
Logistics, Distribution, Transp.	47-4099	Construction and Related Workers, All Other	526	-6	-1.0%	0.68	20	$ 16.20	128	Moderate-term on-the-job training
Food	51-3011	Bakers	2325	-33	-1.0%	0.68	79	$ 10.55	51	Long-term on-the-job training
Logistics, Distribution, Transp.	49-3043	Rail Car Repairers	300	2	1.0%	0.69	15	$ 17.61	4	Long-term on-the-job training

Logistics, Distribution, Transp.	43-4181	Reservation and Transportation Ticket Agents and Travel Clerks	1929	-274	-12.0%	0.70	38	$ 15.75	1	Short-term on-the-job training
Business Services	13-1161	Market Research Analysts and Marketing Specialists	6,328	556	10.0%	0.71	443	$ 26.78	634	Bachelor's degree
Business Services	15-1131	Computer Programmers	5,035	247	5.0%	0.72	248	$ 35.08	570	Bachelor's degree
Business Services	15-1141	Database Administrators	1,754	108	7.0%	0.72	83	$ 34.72	535	Bachelor's degree
Logistics, Distribution, Transp.	47-4061	Rail-Track Laying and Maintenance Equipment Operators	266	-14	-5.0%	0.73	10	$ 18.11	0	Moderate-term on-the-job training
Business Services	15-1152	Computer Network Support Specialists	2,809	126	5.0%	0.75	136	$ 26.72	883	Associate's degree
Healthcare & Medical Devices	51-9082	Medical Appliance Technicians	201	1	1.0%	0.75	10	$ 18.57	0	Long-term on-the-job training
Logistics, Distribution, Transp.	53-4013	Rail Yard Engineers, Dinkey Operators, and Hostlers	84	-4	-5.0%	0.75	4	$ 18.26	0	Moderate-term on-the-job training
Business Services	43-9051	Mail Clerks and Mail Machine Operators, Except Postal Service	1,749	40	2.0%	0.76	55	$ 13.15	15	Short-term on-the-job training
Business Services	13-1071	Human Resources Specialists	6,828	368	6.0%	0.78	303	$ 25.63	226	Bachelor's degree
Business Services	15-1142	Network and Computer Systems Administrators	6,026	380	7.0%	0.80	293	$ 31.81	609	Bachelor's degree
Healthcare & Medical Devices	17-3023	Electrical and Electronics Engineering Technicians	2,448	73	3.0%	0.82	83	$ 25.84	957	Associate's degree
Food	51-3092	Food Batchmakers	1686	43	3.0%	0.82	68	$ 15.31	13	Short-term on-the-job training
Logistics, Distribution, Transp.	53-4099	Rail Transportation Workers, All Other	54	0	0.0%	0.82	2	$ 21.90	181	Moderate-term on-the-job training
Food	41-9011	Demonstrators and Product Promoters	1606	99	7.0%	0.83	99	$ 14.31	0	Short-term on-the-job training
Healthcare & Medical Devices	17-2031	Biomedical Engineers	360	32	10.0%	0.84	24	$ 41.25	124	Bachelor's degree
Logistics, Distribution, Transp.	49-9097	Signal and Track Switch Repairers	157	-2	-1.0%	0.84	5	$ 25.39	181	Postsecondary non-degree award
Logistics, Distribution, Transp.	53-6051	Transportation Inspectors	441	3	1.0%	0.84	14	$ 36.60	2	Short-term on-the-job training
Logistics, Distribution, Transp.	13-1022	Wholesale and Retail Buyers, Except Farm Products	2255	99	5.0%	0.89	108	$ 23.75	47	Long-term on-the-job training
Logistics, Distribution, Transp.	53-4011	Locomotive Engineers	733	4	1.0%	0.89	41	$ 29.74	0	Moderate-term on-the-job training
Logistics, Distribution, Transp.	53-4012	Locomotive Firers	30	-1	-3.0%	0.89	2	$ 21.01	0	Short-term on-the-job training
Food	51-3022	Meat, Poultry, & Fish Cutters & Trimmers	2967	81	3.0%	0.90	127	$ 9.93	0	Short-term on-the-job training
Logistics, Distribution, Transp.	53-4021	Railroad Brake, Signal, and Switch Operators	483	-9	-2.0%	0.90	23	$ 26.23	181	Moderate-term on-the-job training
Logistics, Distribution, Transp.	53-4031	Railroad Conductors and Yardmasters	851	4	0.0%	0.90	41	$ 29.31	181	Moderate-term on-the-job training
Business Services	11-2021	Marketing Managers	3,495	199	6.0%	0.91	200	$ 46.47	634	Bachelor's or higher degree, plus work experience
Food	51-3091	Food & Tobacco Roasting, Baking, & Drying Machine Operators & Tenders	388	19	5.0%	0.92	20	$ 16.68	0	Moderate-term on-the-job training

Logistics, Distribution, Transp.	47-1011	First-Line Supervisors of Construction Trades & Extraction Workers	11723	-292	-2.0%	0.93	285	$ 21.32	322	Work experience in a related occupation
Business Services	43-4171	Receptionists & Information Clerks	19,946	985	5.0%	0.94	1,090	$ 12.48	15	Short-term on-the-job training
Business Services	43-9021	Data Entry Keyers	4,336	54	1.0%	0.94	108	$ 12.97	260	Moderate-term on-the-job training
Business Services	41-9041	Telemarketers	5,283	236	5.0%	0.97	235	$ 13.28	3	Short-term on-the-job training
Auto. Mfg.	47-2152	Plumbers, Pipefitters, and Steamfitters	8095	19	0.0%	0.97	272	$ 18.64	14	Long-term on-the-job training
Logistics, Distribution, Transp.	43-5021	Couriers and Messengers	2228	94	4.0%	0.98	102	$ 12.60	0	Short-term on-the-job training
Business Services	13-1151	Training & Development Specialists	4,677	258	6.0%	0.99	207	$ 29.15	171	Bachelor's degree
Logistics, Distribution, Transp.	53-5021	Captains, Mates, & Pilots of Water Vessels	739	34	5.0%	0.99	66	$ 43.04	0	Bachelor's degree

ECD – Job Growth & Fulfillment

The ECD Research Division has also pulled department specific project activity reflecting only announced jobs since the beginning of the Haslam administration. The data show the historic (2011), current and projected pipeline of jobs on-boarding for the state to prepare for over the next three to five years. These projects also reflect an unprecedented amount of corporate investment in Tennessee, totaling over $11.5 Billion in capital deployment.

The following methodology and results clearly indicate the need for partnership alignment to accelerate the preparation of a skilled workforce to address the state's inventory of unfilled high quality jobs.

Methodology: Identified job fulfillment for ECD's projects from January 2011 to 2013.

- Internal Job Growth Analysis reviewed projects from the month announced through June 2013

Source: ECD Growth Database

Considerations and Limitations of Analysis:

- ECD Projects reviewed were in the earlier stages of the 3-5 year job creation time horizons

Project Analysis Summary	
Number of Projects	333
Announced Jobs January 2011-October 2013	60,211
Announced Jobs in 2011-2012	38,236
Number of Jobs Fulfilled	15,698
Percentage of Jobs Unfulfilled	58.94%
Number of Projects that saw job growth	213
Number of Projects that have met job growth goals	47
Percentage of Manufacturing Projects with Unfulfilled Jobs	86.12%
Corresponding Industry Capital Investment	$11,511,153,232

It is possible for additional research to be conducted that will map project activity across the 9 regional districts of the state as well as by the NAICS industry and overlay those actionable points with available training centers and workforce development assets. It is recommended that as the pipeline evolves and new projects are publicly announced, a coordinated effort with the designated LEAP partners continue to schedule tactical training preparations and deployments, identify cross-sectional/cluster skill needs for training optimization and conduct consultative outreach with current and prospective industries and businesses in the state based on job creation forecasts.