

# APPRENTICESHIP ENGAGEMENT STRATEGY



## **Table of Contents**

Executive Summary and Project Overview .....	1
Scope of Work .....	2
Identification of Targeted Companies .....	3
Stakeholder Meetings .....	8
Apprenticeship Best Practices .....	11
Identified Specific Occupations and Career Pathways .....	13
East Tennessee Regional Advanced Manufacturing Related Programs and Curriculum .....	17
East Tennessee Regional Advanced Manufacturing Occupational Data/Labor Market .....	18
Apprenticeship Study Listening Tour Attendance .....	27
Identify Programs and Resources that Make Programs Successful .....	27
Current Best Practices Apprenticeships Secondary School Programs in Advanced Mfg. ....	29
Creation of an Apprenticeship Pilot Plan in Secondary/Post-secondary .....	30
Conclusion .....	34
Attachments .....	37

## Executive Summary & Project Overview

Roane State Community College serves a rural 8-county area in East Tennessee, offering university-parallel and technical programs that lead to Certificates and A.A.S. degrees. Dual enrollment (DE) classes are an important component to our 8-county area which allows high school students to take college-level classes earning both high school and college-level credit.

When Roane State received this Apprenticeship Grant Agreement, the focus was not on the broad spectrum of East Tennessee but a more narrow view of our own eight county area. This area is rich with Advanced Manufacturing employers who support both the automotive and federal government sectors. Specifically, we aligned our research to focus concentration on three of eight counties which included: Anderson, Loudon, Oak Ridge and Roane Counties.

Advanced Manufacturing jobs are critical to many industries located in the East Tennessee area. These jobs drive small business development, infrastructure development, educational development (pre-school to higher learning), retail business, transportation and logistical needs and much more. Unique to these jobs is the fact there is not one set industry standard for *industry-based certifications* required to perform a particular Advanced Manufacturing job. For example, a technician at one company may be required to have a background or experience working in robotics while another technician may need experience working with manual controlled equipment. A viable solution for these existing and emerging Advanced Manufacturing jobs is to focus on the development of state-wide apprenticeship program template which can then be tailored at the industry level to meet the specific needs of those small or large businesses.

Thus, Roane State's project started with the development of an employer survey which would focus on capturing Apprenticeship information from various companies throughout the four distinct areas identified. The employer visit data should support and aid in the development of the State's efforts to determine the need for U.S. Department of Labor (DOL) Apprenticeship program. This statewide program should become a way to increase the pipeline of workers in the field of Advanced Manufacturing.

This project should also assist in laying the groundwork for establishing industry and training institution partnerships across the East TN region, groundwork that could be utilized for a future DOL apprenticeship grants or other federal, state and local funding opportunities. Through the process of visiting specific Advanced Manufacturing employers, Roane State's project will be able to identify one or more jobs in demand by Advanced Manufacturing companies. Such demand occupations could lead to future or additional partnerships with local community colleges (Roane State Community College, Pellissippi State, Northeast State, Cleveland State and Chattanooga State), K-12 school systems and/or Tennessee Colleges of Applied Technology (TCATs) in the region to design Apprenticeship/Pre-Apprenticeship programs as well as develop pathways that could lead to industry certifications, one-year college certifications, 2 year AAS degrees, 4 year degrees and beyond.

### **Scope of Work**

Roane State's requirements of the Grant Agreement are identified below.

- Identify targeted companies/industries and conduct outreach efforts to collect data on employers' apprenticeship needs, interests and willingness to participate in structured DOL Apprenticeship programs. A minimum of 10 East Tennessee visits was required. Twenty visits were conducted.
- Conduct a minimum of 4 stake-holder meetings where the following partners were invited to participate: secondary education/CTE representatives; post-secondary schools; American Job Center employees/board members and private

sector employers. Four meetings were conducted (one per identified area) plus an additional employer/plant manager meeting took place. Meetings with all four Chambers-of-Commerce were conducted to inform, educate and request assistance with employer identification for data gathering purposes.

- Identify Apprenticeship Best Practices across the nation. These were identified through basic research and three networking/bench marking trips were conducted.
- Identify specific occupations and career paths that support the areas identified by industry/company visits. Alignment with appropriate higher educational programs are shown in data to support the requirement of a US DOL Apprenticeship programs.
- Provide Advanced Manufacturing related secondary/post-secondary programs and curriculum in the East Tennessee Region.
- Provide and analyze occupational data on specific identified labor market information to support the recommendations of the East Tennessee Regional Advanced Manufacturing needs.
- Attend the State hosted Apprenticeship Study Listening Tour.
- Identify programs and resources that make specific programs successful.
- Identify, analyze and review current pre-Apprenticeship practices in secondary school systems pertaining to Advanced Manufacturing.
- Identify schools/systems with exemplary pre-Apprenticeship programs including dual enrollment, work-based learning or similar programs.
- Creation of a pilot plan for Apprenticeship programs in secondary/post-secondary schools. This should include a comprehensive needs-assessment for such a program.

### **Identification of Targeted Companies**

Individual visits to area Chambers-of-Commerce were conducted once the grant was official and required deliverables were identified. Anderson County Chamber President Rick Meredith and ECD Director Tim Thompson were both involved in identifying potential

industries to visit in Anderson County. Oak Ridge Chamber President, Parker Hardy and Vice-President Greta Ownby along with Education and Workforce Chamber Chairperson Stacy Myers assisted with the development of Oak Ridge's list of employers and date for stakeholder meeting. Roane Alliance CEO Wade Creswell, Education & Workforce Development Specialist Allen Lutz and Roane County Schools CTE Director Lance Duff assisted with the Roane County contacts along with the stakeholder meeting alignment with their local Roane County Employers' Association Meeting. Loudon County's ECD Director, Jack Qualls and Administrative Liaison, Blair Patterson assisted in the contact list for Loudon County and placed me on the agenda of their quarterly Plant Managers' meeting. Additional information was shared at the Loudon/Monroe Human Resource Association during their monthly meeting.

Roane State's next step prior to implementing employer visits was the creation of an employer survey. Roane State's staff members developed a survey targeted toward obtaining needed information to help the state in the determination of Apprenticeship program needs.

(Please see *Attachment A: Employer Survey*.)

With survey in hand and list of employers developed, visits were scheduled and implemented across the specified counties.

**Aisin Automotive Casting, LLC** – Anderson County: A brand leader of engine-related functional parts and die cast parts that are essential to vehicle's performance and reliability.

Established in 1996

Total Employees: 730

**Alba Health** – Roane County: Part of Encompass Group. Manufactures and distributes disposable healthcare products. They are a global, quality-driven, integrated pharmaceutical company whose mission is to make the most meaningful difference to health through quality medical products.

Founded in 1975

Total Employees: 168

**Better Made Trailers (BMT)** – Campbell County: Better Made Trailers was born from the need for trailers that are better made. Better Made Trailers’ owner understands that sometimes people need the chance to start again, so the company founded and operates *A New Beginning*. This program offers job opportunities and support to those who have been formerly incarcerated. Founded in early 2017, *A New Beginning* strives to reach individuals who struggle finding employment. It is a well-rounded rehabilitation program offering paid training in a skill or trade, help for basic need resources, counseling and mentoring services. The goals are to reduce recidivism and to increase the number of skilled workers in Campbell County, Tennessee, making a stronger and safer community.

*Vision Statement: A New Beginning* is a program that welcomes, accepts, loves, helps heal, strengthens, and empowers those who are previously incarcerated.

Total Employees: 80

**Campos Foods** – Campbell County: The 85,000 sq. /ft. facility produces fully-cooked frozen hamburger patties, pork, beef and turkey sausage patties and other meat products. Currently works with McDonalds and the packaging of their hamburger patty products.

Established in 2005

Total Employees: 285

**Centrus Energy Corp.** – Oak Ridge: Centrus also works under the name American Centrifuge Mfg. This organization primarily operates in the Uranium Ore Mining, necessary business / industry within the Metal Mining sector.

Total Employees: 200 at Oak Ridge

**Container Technology Industries, LLC.** – Scott County: CTI serves as the preferred fabricator to the Nuclear Industry. They supply many types of products, in addition to containers for the storage, transport and disposal of low-level and mixed-level nuclear waste. CTI maintains a quality program that is compliant with the NQA-1 requirements. Their mission is to satisfy the needs of (EM) environmental management, D&D, DOE, DOD, commercial, and nuclear build plant construction.

Established in 1999

Total Employees: 40

**DelConca USA, Inc.** – Loudon County: With an investment of over 50 million dollars, 30 million of which in Italian technology, the Del Conca Group has arrived in the USA. Their plant covers over 430,000 sq. /ft. and is one of the most modern production plants of porcelain stoneware in the world. They produce “designed in Italy, made in USA” tiles.

Established in 2014

Total Employees: 143

**Dienamic Tooling Systems Group** – Roane County: DTS grew out of the need for metal stamping outside the Detroit area. With Tennessee’s automotive sector demand for tool and die builders arose DTS. Serving the custom stamping needs of the various sectors is their business. Global customer base includes automotive, appliance, and other industrial part manufacturers.

Established in 1997

Total Employees: 67

\*Currently provides Registered Apprenticeship Opportunities in Tool & Die

**Duran Wheaton Kimble (DWK) Life Sciences** – Roane County: Provides precision labware through the company’s recent initiative of uniting the expertise of three global leading brands into one. Eleven sites worldwide producing over 30,000 glass products.

Established in 2017

Total Employees: 375

**Great Dane Trailers** – Scott County: Great Dane has grown into a company known for excellence in the field of transportation by building state-of-the-art semi-tractor trailers.

Established in 1900

Total Employees: 264

**Heareus Metal Processing Inc.** – Morgan County: Heareus combines material expertise with technological know-how. Utilizing this professional knowledge, the company is able to look into various processes, challenges and markets to assist in the development of high quality solutions to aid in universal competitiveness.

Established in 1985

Total Employees: 50+

**Malibu Boats, Inc.** – Loudon County: This manufacturer primarily operates in the customized boatbuilding, repair business and customized product components. Operates under 197,000 sq. /ft. facility.

Established in 1982

Total Employees: 381

**Micro Metals, Inc.** – Fentress County: This centrally located powder metallurgy industry is located in between Nashville and Knoxville which allows them to service 75% of their market within 24 hours. They occupy over 65,000 sq. /ft. which processes durable, complex mechanical components through their various pressing, sintering, and heat/steam treatment processes.

Established in 1976

Total Employees: 130

\*Currently provides Registered Apprenticeship Opportunities in Tool & Die (since 1978).

**Morgan Olson** – Loudon County: Produces aluminum bodied trucks which originated in Brooklyn, NY. Morgan Olson Loudon is the home of the UPS walk-in van body trucks. Operates under 300,000 sq. /ft. producing 30 UPS trucks daily.

Founded in 1946; Loudon Facility in 2015      Total Employees: 382

**MPP Innovation**– Roane County: International provider of custom-engineered powder metallurgy products to customers in various industries. Provide volume ability to produce aluminum products by utilizing an experience workforce acquired recently through the acquisition of NetShape Technologies.

Acquired: 2018      Total Employees: 150

**Oak Ridge Tool Engineering** – Oak Ridge: Engineering and manufacturing custom tooling of high precision and “delivery critical” special tooling, jigs, fixtures, mechanical equipment and short run production for aerospace, defense, energy, automotive and commercial markets. Operates under a 104,000 sq. /ft. facility in Oak Ridge’s Commerce Park which is easily accessed by the DOE customers.

Established in 1962      Total Employees: 55

**SL Tennessee, LLC.** – Anderson County: Part of SL America with three plant sites located in Clinton, TN. A leading global automotive supplier with manufacturing operations and product development, engineering and sales centers in 7 countries. This operation primarily concentrates on building of auto/manual shifters, pedals and park brake levers and injection molding production of various automotive lamps.

Established in 2001      Total Employees: 1200

**Tate & Lyle, PLC.** – Loudon County: This British-based multinational agribusiness originally refined sugar. In 1970’s, the company began to diversify into innovative technology driven processes such as how to turn raw materials (corn and cane sugar) into various ingredients for foods and beverages. The products offered by the company include cereal sweeteners and starches, molasses, alcohol and ethanol, acidulants, sucralose and syrups. Loudon facility is one of fifty production facilities worldwide.

Established corporation in 1933      Total Employees: 315

**Telos Global** – Scott County: An “Edge press hardening solutions mfg.” is a one-stop shop with turnkey services. Telos specializes in Tool & Die processes, Hot Form Production with 5-axis Laser capabilities, specialized production intent training, R&D in process development and press hardening of aluminum/steel products and equipment sales. Operating out of a newly renovated 190,000 sq. /f.t facility, this new company is just now getting production up and running in the East Tennessee area.

Established in 2016

Total Employees: 33

**CNS Y-12** – Oak Ridge: The Y-12 National Security Complex operated under Consolidated Nuclear Security, LLC. is considered as the birthplace of the atomic bomb. The operation’s mission today is to support defense needs through stockpile stewardship, assistance with issues of nuclear non-proliferation, support of Naval Reactors program and guidance of expertise to other federal agencies. Y-12 is a Department of Energy secured facility that operates with/without various bargaining union units. Y-12 is the site for the construction of the new UPF (Uranium Processing Facility) which is slated to be the largest post-war construction project in the state of Tennessee.

Established in 1943

Total Employees: 4700+

For specific details on how each employer responded to the Employer Survey, please refer to *Attachment B: Employer Visit Survey Spreadsheet*.

### **Stakeholder Meetings**

As indicated previously, four designated stakeholder meetings were conducted (Anderson, Roane, Oak Ridge and Loudon) plus an additional employer/plant manager meeting in Loudon. Meetings with all four Chambers-of-Commerce were conducted to inform, educate and request assistance with employer identification prior to stakeholder meetings. A common PowerPoint presentation (please see *Attachment C: Stakeholder Presentation*) was presented at all five meetings as well as the established Stakeholder survey (please see *Attachment D: Stakeholder Survey*).

A total of 15 Stakeholder Surveys were completed and submitted from four meetings at Roane State Clinton, Harriman, Oak Ridge and Loudon County campuses. The respondent representation included secondary schools including Anderson County, Lenoir City, Loudon County, Oak Ridge and Roane County. Post-secondary representation included Cleveland State CC, Pellissippi State CC, Roane

State CC, TCAT's Knoxville and Harriman and UT-CIS. Additional attendees from Loudon County Education Foundation and local Chambers of Commerce Workforce Committee members.

Respondents indicated high interest in participating in the process of setting up Registered Apprenticeships and have indicated available resources ranging from required equipment to instructors to make this happen. Through sidebar conversation after the Loudon County group meeting, the Directors of Lenoir City and Loudon County Schools expressed their excitement over the possibility of a secondary school Pre-Apprenticeship program and their willingness to partner with others in the area to make it happen.

Areas of available training supported by the stakeholders included electrical, welding, machining, mechatronics and Industrial maintenance. Educational stakeholders expressed willingness to expand their programs (dual-enrollment offerings) to include training requested by local industries. Most local high schools have Work-Based Learning programs and have integrated Advanced Manufacturing into their programs through dual-enrollment Mechatronics. Some secondary education facilities have their own resources within their facilities to teach mechatronics onsite. For those areas not already aligned with Advanced Manufacturing, CTE Consultant Christy Seals is willing to work closely with post-secondary educators to see how a partnership can be formed to make those opportunities happen.

Respondents from the realm of organized labor unions stated they have a readily-available pool of candidates for both pre-Apprenticeship and Registered Apprenticeship programs. Interest in developing these programs is not lacking. The main concern expressed throughout the four stakeholder meetings was the ability to get around industries' concerns for the liability insurance issues for youth under the age of 18. Even with the support of state legislation, employers' workers comp companies are most likely not going to allow youth under the age of 18 on the plant floor of a working environment.

For additional information regarding the surveys submitted, please see *Attachment E: Stakeholder Survey Spreadsheet*.

**Anderson County Meeting:** This meeting was held on May 8, 2018, at the Roane State CC Clinton Higher Education Training Facility. Fifteen individuals attended with representation from America's Job Center (WIOA), Anderson County Chamber and ECD, CTE and Gear-up secondary education programs, employers and post-secondary institutions including Pellissippi, Roane State and TCAT- Knoxville. For specific information regarding this meeting (minutes and attendance), please see *Attachment F: Anderson County*.

**Roane County Meeting:** This meeting was held on May 8, 2018, at the Roane State CC Harriman campus. This meeting was combined with the monthly *Roane County Employers' Association Meeting*. Seventeen individuals attended with representation from America's Job Center (WIOA), CTE secondary education programs, employers, NAACP representative, post-secondary institutions including Roane State and TCAT- Harriman and Roane Alliance representative. For specific information regarding this meeting (minutes and attendance), please see *Attachment G: Roane County*.

**Oak Ridge Meeting:** This meeting was held on May 14, 2018, at the Roane State CC Oak Ridge campus. Seventeen individuals attended with representation from America's Job Center (WIOA), Chamber of Commerce – Oak Ridge, CTE secondary education program, employers, local labor union representation and post-secondary institutions including Roane State and UT-CIS. For specific information regarding this meeting (minutes and attendance), please see *Attachment H: Oak Ridge*.

**Loudon County Meeting:** This meeting was held on May 24, 2018, at the Roane State CC Loudon County campus. Eighteen individuals attended with representation from America's Job Center (WIOA), CTE secondary education programs, CTE Regional Consultant, ECD Loudon County, employers, Lenoir City School Director and post-secondary institutions including Cleveland State, Roane State and TCAT-Harriman. For specific information regarding this meeting (minutes and attendance), please see *Attachment I: Loudon County*.

### **Apprenticeship Best Practices**

When determining the best programs to visit, staff members looked at programs that currently offered Advanced Manufacturing Apprenticeship programs. Outside of our own Tennessee's best practice Northeast CC's RCAM Apprenticeship program, Central Piedmont CC – North Carolina, Greenville Technical College – South Carolina and Harper CC – Illinois were selected. All three of these programs were strong with state support and were well established with key employers driving their programs.

**Central Piedmont** – Launched *Apprenticeship 2000* in 1995 focused strictly on Mechatronics. Specifically employer driven utilizing the German model as their structure. This was a 4 year, 6400 OJT hour program. Their second program, *Apprenticeship Charlotte*, was launched in 2012. This program expanded *Apprenticeship 2000* from Mechatronics by adding CI Machining, Diesel Mechanics, IT and Electrical Engineering Technician. This program is primarily educator driven and is more flexible to meet the needs of the employer. Both programs are employer driven, focused on strong high-school recruitment and are well funded by both state and federal government grants.

For more information on Central Piedmont's program, please see *Attachments: J & K*.

**Greenville Technical** – Greenville's program is part of the Apprenticeship Carolina, SC Technical College System. This state driven program began mid 2000 through a Chamber of Commerce initiative. This program has acquired vast state support which allows them to be sustainable and achieve continued growth. To date, they have served well over 27,000 Registered Apprentices. The 4 year program focuses on 2000 OJT hours pr. /yr. along with 144 educational hr. /yr. All Apprenticeships require either a certification or degree of some sort. They work closely with the college to integrate the non-credit division to help achieve this. These Apprenticeships are owned by the employer but supported by state consultants who help with the processes.

They also have a successful Youth Apprenticeship program in the secondary schools. These are USDOL approved for juniors and seniors to take part in. They include 2000 OJT hr. /yr. and 144 educational hr. /yr. that can articulate over into a regular Apprenticeship program upon completion.

For more information on Greenville Tech's program, please see *Attachment: L*.

**Harper College** – Harper College provides a variety of Apprenticeship opportunities. Each of the Registered Apprenticeship programs aligns directly with an existing A.A.S. program. From white collar to blue collar, the program structure is 3 years in length. OJT time is approximately 2000 hours total but is determined by USDOL's Apprenticability List. If the required OJT hours exceeds 3 years, the program can become "competency based" so the apprentice can achieve success within that identified timeframe. The programs are employer driven with employers absorbing the direct cost of training the apprentices.

Harper College markets the apprenticeship program as a Customized Commercial Training Product (CCTP). The pricing is determined using the formula “Tuition x 2”, which is billed directly to employers by the college’s Workforce Development Office. This comes to a total of \$18,000 for the 3-year program. The college pays students’ tuition, fees, books and required PPE. The college also takes care of all communication with US DOL. Employers are billed at the beginning of each semester. Harper’s selling point is an Apprenticeship program costs “Only \$3,000 per semester!”

For more information on Harper College’s program, please see *Attachment: M*.

### **Identified Specific Occupations and Career Pathways**

The following secondary-to-post-secondary-to-workforce strategy will help support the areas identified by industry/company visits in their Advanced Manufacturing sector needs. Employers’ most common response for their workforce needs was some form of maintenance technician/mechatronics. This spanned the full range of manufacturing and other automated assembly equipment technicians. After analyzing the employer responses, Roane State concluded the second need that emerged was that of chemical manufacturing/chemical engineering technology. A third skill identified was basic entry-level to advanced/specialized welding. A fourth skill was CNC milling/machine operators; individuals to set-up, monitor and maintain the equipment (not programmers). The final most commonly projected future demand for apprenticeships was the request for robotics. Based on the responses gathered in the company visits and in the stakeholder meetings, Roane State proposes a gradual development of the following programs for Apprenticeships:

**Mechatronics Technology** - This program is fully implemented as a Certificate and A.A.S. program in Community Colleges across Tennessee. The TBR system has articulation pathways from TCAT's Industrial Maintenance programs into college certificates and A.A.S. Degrees. There are numerous opportunities for dual enrollment courses in local high schools which transfer into the colleges. The skills encompassed in this program roughly fill the skills aligned with responses of "Industrial Maintenance", "Maintenance Technician" and similar skill sets.

**Chemical Engineering Technology** - This program is fully developed and implemented at Community Colleges across Tennessee. An apprenticeship program lends itself to align with the Certificate and A.A.S. programs as is proven by the current Northeast State's RCAM model.

**Robotics** – This topic is offered and embedded to some degree in many of the Community Colleges' Mechatronics programs. Roane State is seeking funds to develop a Robotics program as a specialization under the A.A.S. Mechatronics. This program would include a sequence of courses for vision systems on robots (including 2D and 3D vision, robotic quality control, robotic measurement and collaborative robots). Given the significant equipment cost of this program, it is expected that this program will possibly be available by 2020/21. With that said, the program would lend itself to an Apprenticeship program and could be stood up prior to that date if sharing of resources could take place.

**Welding** - TCAT's are the primary location for basic welding in the East Tennessee area. Strategies could involve a collaboration between Community Colleges working as the administrator of Apprenticeship programs. Some Community Colleges have specialized Welding

Certificates and/or A.A.S. Degrees. These can also be woven into an Apprenticeship opportunity through the same process.

**CNC and Machinists** – These programs are currently being offered by TCAT’s as well. They will be aligned with Apprenticeship OJT employers’ training to yield a successful apprentice.

The East Tennessee Community Colleges offering Advanced Manufacturing programs can be found on *Attachment N* along with additional information on specialized training that could be offered outside of the credit offerings.

**Chattanooga State** – Chattanooga State provides their area’s learners with a one-stop shop concept by offering both the TN College of Applied Technology (TCAT) programs as well as the Community College programs. A student can align with a Diploma program, Certificate program or one of the many Community College Degree programs. Customized training through the Wacker Institute facility provides a partnership between Chattanooga State’s Engineering Technology Division and Wacker Polysilicon North America to provide them with the trained chemical engineering technology workers they need. Another key partnership is the VW Mechatronics program that trains technicians as needed in all aspects of the body, mechanical and electrical/electronic systems of VW vehicles.

**Cleveland State** – Cleveland State is home to a new high school honors program designed for students majoring in Mechatronics Technology. The college selects students who work in a classroom setting while supplementing their learning with real-world training in a manufacturing setting and getting paid. These students will be attending classes 2 days/week and working in a real-world manufacturing setting the other 3 days/week. Based upon these

current practices, this program could be the beginnings of a pre-Apprenticeship or Youth Apprenticeship program.

Cleveland State's Corporate/Workforce Training focuses on Industrial Technologies with Allen Bradley courses, Mfg. Leadership Series training, Mechatronics for Incumbent Workers, PLC training, Rapid Advanced Mfg. Preparedness and Welding. These are non-credit, industry specific training courses offered to their employer base.

**Northeast State** – Northeast State is the home of RCAM (Regional Center for Advanced Manufacturing). This facility offers state-of-the-art regional manufacturing training right at the foot of Eastman and Domtar companies. Both of these companies have invested time and funds to equip this facility with the latest simulators, flexible classroom environments and quality instructors training their employees and others to learn Advanced Manufacturing skills. RCAM courses may be used to fulfill requirements for A.A.S. Degrees and/or Technical Certificates. They also offer customized training to area business and industries. Northeast State works closely with US Department of Labor (US DOL) to have their programs align seamlessly with the requirements of approved Apprenticeship programs.

**Pellissippi State** – Pellissippi State offers a variety of engineering technology based training. Their Straw Plains facility offers Dual Enrollment opportunities to high school students in these fields along with opportunities for welding. Pellissippi is working with one specific company in Metro-Knoxville to align their welding program with US DOL Apprenticeship opportunities. They also offer various welding courses through their non-credit Workforce training area.

**Roane State** – Roane State offers both Mechatronics Certification and A.A.S. Degree programs. The college also offers a strong Dual Enrollment program in Mechatronics throughout the Roane State service delivery area. The Clinton Higher Education and Training Center offers state-of-the-art trainers and hands-on equipment that have been purchased through the various grants or through various employer donations with which the college partners. A strong Workforce non-credit program customizes requested Mechatronics training across the nine county area. Roane State will offer both Chemical Engineering Technologies Certificate and A.A.S. Degree programs beginning in fall 2018.

**Walter State** – Walter State offers Engineering Technology courses focused on Automated Industrial Systems as well as Operations Management. They also have Workforce non-credit training in the field of welding. Their Workforce Training division will customize whatever training is needed by the industry sector upon request.

For additional information regarding each of the Community College's curriculum shown on *Attachment N*, please see each college website.

### **East Tennessee Regional Advanced Manufacturing Related Secondary/Post-secondary Programs and Curriculum**

Please see *Attachment N* for East Tennessee's Community College programs. Although each of the secondary schools may not have specific Advanced Manufacturing CTE programs in place, efforts are being made to partner with area TCAT's and Community Colleges to share resources so that programs can be started in students' junior and senior years.

## East Tennessee Regional Advanced Manufacturing Occupational Data/Labor Market Information

As reported in our original grant proposal, THEC/University of TN Data from The 2016 Academic Supply and Occupational Demand Report<sup>1</sup> highlights manufacturing as a growth industry in Tennessee with the most in-demand career fields. In Tennessee, the Precision Production Pathway Program of Study is projected to have an annual deficit of 2,633 prepared workers and Production Operations and Maintenance an annual deficit of 1,745.<sup>2</sup> This report demonstrates the growth in other occupations for which training in this project addresses. Furthermore, TN Dept. of Labor & Workforce Development (TDOLWD) Data projects continued growth through 2022, with job openings anticipated for every year, in occupations related to Advanced Manufacturing in LWDA 3 & 4 (which includes Anderson, Blount, Campbell, Cumberland, Knox, Loudon, Monroe, Morgan, Roane and Scott Counties). This area encompasses surrounding counties in which the residents of the targeted counties work. This increase includes jobs such as Other Installation and Maintenance/Repair Workers (165 annual average openings/year with an average annual 3.5% growth rate); Metal/Plastic Workers (125 openings/year with a 1.0% growth rate); and Fabricators (255 openings/year with a 1.5% growth rate). *LWIA 4 Hot Careers* includes team assemblers, maintenance and repair workers and industrial machinery mechanics.<sup>3</sup> The manufacturing technician job outlook for LWIAs 3

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<sup>1</sup> TN Higher Education Commission. (2016). *Academic Supply and Occupational Demand Report in Tennessee*. Retrieved from [https://www.tn.gov/assets/entities/thec/attachments/SupplyandDemand\\_011415.pdf](https://www.tn.gov/assets/entities/thec/attachments/SupplyandDemand_011415.pdf).

<sup>2</sup> TN Higher Education Commission. (2016). *Academic Supply and Occupational Demand Report in Tennessee*, pp 15. Retrieved from [https://www.tn.gov/assets/entities/thec/attachments/SupplyandDemand\\_011415.pdf](https://www.tn.gov/assets/entities/thec/attachments/SupplyandDemand_011415.pdf).

<sup>3</sup> Tennessee Department of Labor and Workforce Development. (2016). *Hot Careers to 2022. LWIA 4: Anderson, Blount, Campbell, Cumberland, Loudon, Morgan, Monroe, Roane, and Scott Counties*. Retrieved from [https://www.tn.gov/assets/entities/labor/attachments/lwia4\\_2020outlooks.pdf](https://www.tn.gov/assets/entities/labor/attachments/lwia4_2020outlooks.pdf).

and 4 is positive growth including manufacturing production technicians, industrial engineering technicians and machinery workers and electro-mechanical technicians.

East Tennessee's impact of the Government Facilities as well as the Research and Technology Transfer Facilities in the Regions can be vast. Oak Ridge is the home of the world class Oak Ridge National Laboratory (ORNL). ORNL is managed by UT-Battelle, LLC (University of Tennessee) for the U.S. Dept. of Energy. ORNL is the home to one of the nation's strongest material science programs and is a leading research center for carbon fiber and composites. ORNL received a \$34.7M ARRA grant to build the Carbon Fiber Technology Center<sup>4</sup> to further develop composites/carbon fiber technology to serve as a resource for the growth of current and new technology particularly in the automotive sector of the advanced manufacturing industry. One great potential of the composites/carbon fiber industry is the dramatic change to the structure of automobiles that will make them even more lightweight, durable, safe, and both cost and fuel efficient. Evidence suggests this technology is becoming a critical driver of the automotive industry.<sup>5</sup> The *2010 Economic Report to the Governor of Tennessee* states, "Tennessee will need to offer a highly-skilled workforce and complements to the design, production and assembly processes (like research and development capacity) to maintain and support this (automotive) important industry cluster."<sup>6</sup>

The Strengthening the East TN Region 2020 Report supports the conclusions above and documents the importance of workers moving from low skills jobs in Advanced Manufacturing

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<sup>4</sup> [http://www.ornl.gov/info/press\\_releases/get\\_press\\_release.cfm?ReleaseNumber=mr20091204-00](http://www.ornl.gov/info/press_releases/get_press_release.cfm?ReleaseNumber=mr20091204-00) 4/19/10

<sup>5</sup> *MotorTrend* (<http://www.motortrend.com/features/newswire/22116/index.html>), *CompositesWorld* (<http://www.compositesworld.com/articles/corvette39s-carbon-hood-creates-shock-and-awe>) 4/19/10

<sup>6</sup> An Economic Report to the Governor of the State of Tennessee, <http://cber.bus.utk.edu/erg/erg10c4.pdf> 4/19/10

to the middle skills occupation ladder (with a post-secondary degree) in order to increase their median wages by over \$9/hour.<sup>7</sup> One of the conclusions is LWDA 4 has a density of middle skill jobs 21% higher than the nation.<sup>8</sup>

Demographic data indicates many adults are undereducated and consequently not prepared to fill the emerging technology jobs of the future. Additionally, these adults are from low income households and in need of higher wage employment. Due to the intersection of Interstates 75 and 40 near Knoxville, Clinton and Oak Ridge (Knox and Anderson counties) and the attraction of high-wage, high-skilled employment, travel to these areas is reasonable for many workers coming from counties that are rural, impoverished and experiencing higher unemployment rate. These jobs are not just in the Advanced Manufacturing sector of private industry but also at the Oak Ridge Department of Energy Y-12 National Security Complex and its subcontractors. According to TDOLWD data, November 2017 unemployment in Anderson, Campbell, Cumberland, Morgan, Roane and Scott counties continues to be higher than the state unemployment of 3.3% and Campbell, Morgan and Scott counties continue to be at or higher than the national unemployment of 4.1%. Consequently, the importance of understanding the needs and demands of some of the more rural counties with lower education and income rates and higher unemployment and poverty rates is of critical importance. Exploring avenues such as Apprenticeships is a key way to help employers meet their skilled jobs needs and at the same time help incumbent workers move up the career

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<sup>7</sup> Nashville Area Chamber of Commerce Research Center. (2016). *Strengthening the East Tennessee Region 2020: Building a Vital Workforce to Sustain Economic Growth and Expand Opportunity for Local Workforce Development Area 4*, pp 16. Career Pathways in Leading Industries. EMSI (2016).

<sup>8</sup> Nashville Area Chamber of Commerce Research Center. (2016). *Strengthening the East Tennessee Region 2020: Building a Vital Workforce to Sustain Economic Growth and Expand Opportunity for Local Workforce Development Area 4*, pp 12.

ladder and unemployed workers enter a workforce with a strong career ladder offering future growth and wages. This also proves to be a pipeline of potential Apprenticeship candidates for future programs.

To support the five identified areas which can be enhanced by the alignment with US DOL Apprenticeship programs, please see the information below which provides justification for Roane State's selection. *Attachment O* identifies current hiring trends based on occupations. Please note that the data information used for selection purposes includes the following counties: Anderson, Blount, Campbell, Cumberland, Knox, Loudon, Monroe, Morgan, Roane and Scott Counties.

#### **Chemical Equipment Operators and Tenders (SOC 51-9011)**

According to labor data compiled by Economic Modeling Specialist International (EMSI), the number of jobs for Chemical Equipment Operators and Tenders (SOC 51-4041) in RSCC's service area is expected to grow 4.0% over the next five years compared to a decline of 2.2% nationally. Due to this anticipated growth and the direct input from local employers, Roane State is moving forward in the development of both a Certificate and A.A.S. Degree program in Chemical Operator Technician. The current area program only granted four certificates in 2016 (IPEDS). This did not come close to matching the 37 job openings in that same year (EMSI). With both the growth in the number of jobs and 20.4% of those employed over 55 (EMSI), the gap between the number of program completions and job openings will only continue to widen.

**Chemical Equipment Operators and Tenders (SOC 51-9011):**

Operate or tend equipment to control chemical changes or reactions in the processing of industrial or consumer products. Equipment used includes devulcanizers, steam-jacketed kettles, and reactor vessels. Excludes "Chemical Plant and System Operators" (51-8091).

**Sample of Reported Job Titles:**

- Chemical Operator/ Chemical Processor
- Vessel Operator
- Spray Dry Operator
- Production Technician
- Production Operator
- Process Operator
- Outside Operator
- Operator
- Multiskill Operator

**CNC / Machinist (51-4041)**

According labor data compiled by Economic Modeling Specialist International (EMSI), the number of jobs for Machinists (SOC 51-4041) in RSCC's service area is expected to grow 21.8% over the next five years compared to 9.5% nationally. Current programs are barely producing half of the graduates needed for job openings. In 2016, 69 certificates were granted (IPEDS) with 117 job openings for Machinists (EMSI). With both the growth in the number of jobs and 22.7% of those employed over 55 (EMSI), the gulf between the number of program completions and job openings will only continue to widen.

**Machinists (SOC 51-4041):**

Set up and operate a variety of machine tools to produce precision parts and instruments.

Includes precision instrument makers who fabricate, modify, or repair mechanical instruments.

May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, mathematics, metal properties, layout, and machining procedures.

**Sample of Reported Job Titles:**

- Maintenance Machinist
- Tool Room Machinist
- Production Machinist
- Manual Lathe Machinist
- Gear Machinist
- CNC Machinist (Computer Numerically Controlled Machinist)
- Utility Operator
- Set-Up Operator
- Set-Up Machinist
- Senior Maintenance Machinist

**Mechatronics/Engineering Technicians (SOC 17-3029)**

According labor data compiled by Economic Modeling Specialist International (EMSI), the number of jobs for Engineering Technicians (SOC 17-3029) in RSCC's service area is expected to grow 7.8% over the next five years compared to 3.2% nationally. With both the growth in the number of jobs and 27.9% of those employed over 55 (EMSI), the number of job openings will continue to grow in RSCC's service area.

This SOC is inclusive of the following:

**Engineering Technicians, Except Drafters, All Other (SOC 17-3029):**

All engineering technicians, except drafters, not listed separately

**Related O\*NET Occupations:**

- Non-Destructive Testing Specialists Look at Non-Destructive Testing Specialists (17-3029.01)
- Electrical Engineering Technologists Look at Electrical Engineering Technologists (17-3029.02)
- Electromechanical Engineering Technologists Look at Electromechanical Engineering Technologists (17-3029.03)
- Electronics Engineering Technologists Look at Electronics Engineering Technologists (17-3029.04)
- Industrial Engineering Technologists Look at Industrial Engineering Technologists (17-3029.05)
- Manufacturing Engineering Technologists Look at Manufacturing Engineering Technologists (17-3029.06)
- Mechanical Engineering Technologists Look at Mechanical Engineering Technologists(17-3029.07)
- Photonics Technicians Look at Photonics Technicians in a onet occupation report (17-3029.08)
- Manufacturing Production Technicians Look at Manufacturing Production Technicians (17-3029.09)
- Nanotechnology Engineering Technologists Look at Nanotechnology Engineering Technologists(17-3029.11)
- Nanotechnology Engineering Technicians Look at Nanotechnology Engineering Technicians(17-3029.12)

**Robotics Technicians - Mechanical Engineering Technicians (SOC 17-3027)  
- Electro-Mechanical Technicians (SOC 17-3024)**

According labor data compiled by Economic Modeling Specialist International (EMSI), the number of jobs for mechanic engineering technicians (SOC 17-3027) and electro-mechanical technicians (SOC 17-3024) in RSCC's service area is expected to grow 10.5% over the next ten years compared to 4.6% nationally and 8.1% in the state of Tennessee. Both technician jobs include Robotics Technician as a sub-category or return jobs under that title when searching. There are approximately 209 job openings per year, 24% above the national average. With both the growth in the number of jobs and 23.7% of those employed over 55 (EMSI), the

number of job openings will continue to outpace the number of robotics degrees awarded in RSCC's service area.

**Mechanical Engineering Technicians (SOC 17-3027):**

Apply theory and principles of mechanical engineering to modify, develop, test, or calibrate machinery and equipment under direction of engineering staff or physical scientists.

**Sample of Reported Job Titles:**

- Research and Development Technician
- Mechanical Technician
- Robotics Technician
- Refrigeration Technician
- Process Technician
- Test Engineer
- Research Technician
- Laboratory Technician (Lab Technician)
- Engineering Team Supervisor
- Emissions Engineer

**Electro-Mechanical Technicians (SOC 17-3024):**

Operate, test, maintain, or calibrate unmanned, automated, servo-mechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment at worksites, such as oil rigs, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.

**Sample of Reported Job Titles:**

- Mechanic
- Tester
- Test Technician
- Product Test Specialist
- Mechanical Technician
- Automation Technician

- Instrumentation Technician
- Instrument Specialist
- Field Service Technician
- Electronics Technician

**Related O\*NET Occupations:**

- Electro-Mechanical Technicians (17-3024.00)
- Robotics Technicians (17-3024.01)

**Welders (SOC 51-4121)**

According labor data compiled by Economic Modeling Specialist International (EMSI), the number of jobs for welders (SOC 51-4121) in RSCC's service area is expected to grow 10.3% over the next five years compared to 6.1% nationally. Current programs are barely keeping up with the number of job openings. In 2016, 116 welding certificates were granted (IPEDS) with 117 job openings in welding (EMSI). With both the growth in the number of jobs and 14% of those employed over 55 (EMSI), the number of job openings will continue to outpace the number of welding certificates awarded in RSCC's service area.

**Welders, Cutters, Solderers and Brazers (SOC 51-4121):**

Use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.

**Sample of Reported Job Titles:**

- Maintenance Welder
- Aluminum Welder
- Welder Fabricator
- Production Welder
- Welding Technician
- Wirer
- Solderer
- Refrigeration Specialist
- Refrigeration Brazer/Solderer
- Production Technician

### **Related O\*NET Occupations:**

- Welders, Cutters, and Welder Fitters Look at Welders, Cutters, and Welder Fitters in a onet occupation report (51-4121.06)
- Solderers and Brazers Look at Solderers and Brazers in a onet - occupation report (51-4121.07)

### **Attend the State hosted Apprenticeship Study Listening Tour**

Roane State Director of Workforce Training & Placement, Kim Harris attended the state hosted Apprenticeship Study Listening Tour in Kingsport on March 27<sup>th</sup>. Dr. Markus Pomper, Dean of Math/Science and Ed Purdy, Workforce Trainer attended the Athens' Listening Tour. Kim Harris and Teresa Duncan both attended the ECD Apprenticeship Summit held in Nashville on May 22<sup>nd</sup>.

### **Identify Programs and Resources That Make Programs Successful**

Based on Roane State staffs' Best Practices trips, it is apparent that the programs which are most successful both in implementation and securing external grant funding (through USDOL or other resources) are those that are aligned with a strong business partner and who have secured state "buy-in" from the beginning. An East Tennessee example of this is Northeast State's RCAM. Support from local and State government was present from the beginning and with the commitment of two strong employer stakeholders, Eastman and Domtar, a successful program has been created and sustained. Successful programs benchmarked in our Best Practices trips uniformly had government and local chambers of commerce supporting and assisting with program coordination. Businesses were actively recruited and empowered to work with and through secondary and post-secondary educators

to bring students into Apprenticeship programs. State agencies oversee such programs or educators are given the funding necessary to administer and, most significantly, expand these programs and to fully equip their training facilities – via grants, government allocations and business donations. As technology advances at a rapid pace, the partners work together to constantly update and improve the Apprenticeship training to meet the ever changing needs of business and industry.

Rather than re-creating a program from the beginning, partners can customize a state-wide framework to meet the specific needs of their specific area. Funding must follow the needs. When you look at the development of the Advanced Manufacturing workforce, the programs are heavily burdened with equipment costs. By securing the support of industry, programs can succeed by utilizing industry equipment during off times or through industry donations as they occur. Rather than purchasing high dollar equipment, the state should look at the use of lease arrangements and blanket order purchases of like equipment. Leasing arrangements would assist in the future replacement needs of outdated equipment and technology. As we saw with Central Piedmont’s programs, the use of virtual technology could be another option of program integration in various secondary school systems as well as in rural areas where many Community College campuses may exist.

To create a successful program, state and local government and economic agencies must support and develop a standardized framework which establishes Apprenticeship pathways for students, identifies and coordinates funding opportunities for educational entities and minimizes paperwork, duplication of services and confusion for potential industry partners. Program “champions” need to be identified and supported at each level – government,

education and business. Partners would be able to customize a statewide framework to meet regional needs. A coordinated statewide or regional effort will insure the success and sustainability of developing a 21<sup>st</sup> century workforce for advanced manufacturing.

### **Current Best Practices Apprenticeship Secondary School Programs in Advanced Manufacturing**

Based upon partner information secured during the four stakeholder meetings, there are no current best practice Pre-Apprenticeship or Youth Apprenticeship programs taking place in the grant's designated East Tennessee area. There are pockets of strong Work-Based Learning programs in some sectors as well as strong Dual Enrollment and CTE Advanced Manufacturing programs. Oliver Springs High School has the foundation of what could easily turn into a Youth Apprenticeship or Pre-Apprenticeship program. On the same note, Roane State interviewed DTS (Dienamic Tooling Systems Group) who goes against the odds and hires high school students. They start them with intensions of grooming them for their USDOL Apprenticeship program. They recruit from local CTE programs as well as from the local TCATs' Tool & Die programs.

The stakeholder meetings did foster communications of core partners regarding how programs could be blended together to serve the secondary-to-post-secondary pathways. Of those programs, Cleveland State's Mechatronics' Honors Program; Northeast's Programming & Robotics Dual Enrollment program; Roane State's Anderson County, Lenoir City and Roane County's CTE Dual Enrollment Mechatronics programs all stood out as front leaders.

Additionally, Dual Enrollment programs such as Industrial Maintenance, Machine Tool Technology and Welding found at in East Tennessee's ten TCAT's are producing viable Apprenticeship candidates and pathways. With the proper framework in place, the sufficient state support and active business partners, these and other such programs could easily become the basis for Youth, Pre-Apprenticeship and Registered Apprenticeship programs in Tennessee.

### **Creation of an Apprenticeship Pilot Plan in Secondary/Post-Secondary**

Based on the responses gathered in the stakeholder meetings, Roane State proposes the development of the following programs for Apprenticeships and/or Pre-Apprenticeship programs:

- Mechatronics Technology
- Chemical Engineering
- Robotics Technicians
- Welders
- CNC/Machinists

Credit and non-credit Workforce training is available in each of these areas and is offered by multiple providers. Coordination and inclusion of both credit and non-credit training (via Prior Learning Assessment) into an Apprenticeship program is a benefit to potential apprentices.

If Roane State were to implement a Pilot Program in the near future, Mechatronics would be our choice. It is both the most requested program from area employers and is the most developed and sustainable program through which to launch such as effort by Roane State. We would propose the use of this program to develop the concept for Registered Apprenticeship programs in the East Tennessee region as well. As such, Roane State would become a USDOL

approved provider for registered apprenticeships and would offer this as a group program.

Adding additional programs would then face a much easier approval process.

In order to develop the program, Roane State proposes the following path of action and the development of the following program parameters in conjunction with area employers. These questions would need to be answered:

- *What is the appropriate length of the apprenticeship?* Given the responses from employers in focus groups and individual meetings, a duration between 2 and 3 years seems to be acceptable and feasible.
- *How should Related Instructional Training (RIT – the in-class training component) at the college be scheduled?* During best practices site visits, observation showed two possible models for scheduling students' class time. Both have advantages and disadvantages. Ultimately, stakeholders will determine which option is preferable.
- *What competencies should be taught through OJT?* Stakeholders would need to provide a list of requested competencies to be taught through OJT. Parts of the list may be amended as needed for individual apprentices. Roane State is able to award up to 6 credit hours in technical electives toward the A.A.S. through PLA mechanisms if associated skills have been taught through OJT.
- *What entrance criteria should be used for students to be admitted into the program?* Since Roane State's Apprenticeship program will include an A.A.S. in Mechatronics, students will need to enter post-secondary training at specific levels. If not, remedial classes may be requirements.

The possible combination of taking a remedial pre-requisite class, an introductory class and completion of an internship/OJT hours with the company could serve as a Pre-Apprenticeship program. This mechanism could be used by companies to evaluate the fit of prospective apprentice candidates and it would allow prospective apprentices to determine whether the work environment and the academic expectations match his/her goals and skills.

- Additional questions and tasks would include the development of a pay-raise schedule, sample contracts and similar required document items. The finalized apprenticeship concept would to be registered with US DOL for approval. Furthermore, the questions about WBL and liability insurance would need to be addressed at the statewide level before Pre-Apprenticeships at for the secondary education sector could be implemented.

### **Comprehensive Needs Assessment**

In order to implement an apprenticeship program in the area, Roane State envisions the creation of an East Tennessee Apprenticeship Center. This regional center would coordinate the Apprenticeship activities at the educational partners (Community Colleges, TCATS and participating high schools), the cooperating employers and state and federal entities.

This assessment is divided into four categories: Personnel, Physical Facilities, Equipment and Support from State Agencies.

**Personnel:** Roane State recommends the hiring of an Apprenticeship Coordinator/Marketer, a Student Coach and a portion of an administrative support person. The coordinator will act as the liaison between industry partners, current and future apprentices, program faculty and industry mentors.

Specifically, the Coordinator and the Coach will:

- Represent and market the program to current employers. He/she will report on the progress of apprentices in meeting course goals, handle invoicing of student tuition and fees and collect feedback on an ongoing basis.
- Recruit future apprentices and connect them with potential employers for hiring into the Apprenticeship program. The coordinator will engage current students, address concerns expressed by their employers and plan remediation strategies if needed. The coordinator will engage students into the development of soft skills, as appropriate.

- Interact with program faculty and program director as needed in order to address areas of shortcoming identified by employers.
- Interact with industry mentors. Create appropriate professional development plans for the mentors and aid in development of teaching strategies. The coordinator will document the training performed through OJT and will evaluate learning through PLA mechanisms.
- Maintain the training records, communicate with federal and state offices, maintain documentation regarding TN Promise and TN Reconnect scholarships, and oversee student registration and retention.

**Physical Facilities:** Roane State envisions the Apprenticeship program being housed in a designated facility. This serves as training facility for students, a meeting place for employers and is known as the intellectual hub of the manufacturing community.

This facility will also host the structured training (RIT) facilities for the Apprenticeship programs. As such, expected needed space is as follows:

- 12,000 sq./ ft. air conditioned industrial laboratory space in support of mechatronics and robotics
- 8,000 sq./ ft. air conditioned industrial laboratory space in support of chemical engineering technology, along with an outside pad for installation of a potential pilot plant
- 8,000 sq./ ft. industrial laboratory space in support of welding
- 8,000 sq./ ft. air conditioned industrial laboratory space in support of machining/CNC
- 15,000 sq./ ft. for classrooms, offices and common areas

**Equipment:** Roane State did not create a detailed equipment lists. We expect that educational partners would initially rely on their own training equipment. However, to create a true, state-of-the-art regional Apprenticeship center, significant funding for up-to-date equipment and technologies would be necessary in the range of \$4.0 to \$4.5 million.

Youth and pre-Apprenticeship programs would also require investment in participating high school programs for equipment to be used on their sites. This would be locally-specific and

customized to meet school needs and interests.

**State Support:** The state should support educational partners in two ways:

- Develop a convincing and comprehensive liability structure for OJT for under-age pre-apprenticeship students
- Facilitate the communication with the US DOL field office in completing the paperwork for Registered Apprenticeships.

Apprenticeship candidates would be recruited through contact efforts with the business and industries focused on Advanced Manufacturing interested in implementing a Registered Apprenticeship program as well as the individuals that currently take those programs at secondary systems, TCAT's or Community Colleges. The best way to develop such a system is through the "pull system approach" where the draw is the potential opportunity for the employee candidate gets face time with those employers. Employers would be interested with the possibility of getting the "best and brightest" of the program. Other resources will be the local WIOA systems, existing labor union programs and/or general public.

## **Conclusion**

The time is right for Tennessee to make the move to put together a state-wide Apprenticeship program. History has proven that Apprenticeships are a successful way to develop a strong workforce development strategy that pays dividends to companies and sectors that utilize them. Of those that use them, higher productivity, higher retention rates and higher returns-on-investments are achieved. Throughout our country, Apprenticeships solve the problem of filling the skills-gap, the shortage of trained workers and fills the pipeline with trained workers who can take a company to the next level of success.

US Department of Labor Secretary R. Alexander Acosta puts it simply, “Apprenticeships hold the promise in helping American workers acquire the skills they need to get good jobs while ensuring companies can attract the talent required to succeed in this fast-moving global economy.” As identified by the US Department of Labor, the direct company benefits of Apprenticeships are:

- Helps recruit and develop a highly skilled workforce
- Improves productivity and the bottom-line of the business
- Provides opportunities for tax credits
- Reduces turnover costs and increases employee retention
- Creates industry driven and flexible training solutions to meet national and local needs
- Allows workers to earn and learn at the same time

By providing Tennesseans with the opportunity to “earn-while-you-learn”, people are more likely to take advantage of educational opportunities that tool them up for today’s economy and tomorrow’s necessary skills. Apprenticeship programs are not our father’s programs, nor are they utilizing skills of the 20<sup>th</sup> century. They are driven by state-of-the-art technology and skills needed to support global competition. Today’s employers are needing their workforce to possess the soft skills as well as the necessary skills to help them remain globally competitive. Yesterday’s workforce was driven by education. Students go to school to learn a set of skills and then graduate “ready” to work. Today’s workforce is driven by business. Employers become an integrant part of the student’s educational process. They go to school to learn specific skills needed for the job while working with employers to perform those skills while they learn-and-earn.

Now more than ever, Americans/Tennesseans need educational opportunities and career pathways which are cost effective and directed toward delivering skilled careers and

stable employment. Consider that right now there are six million vacant positions across America which remain open and unfilled due to our nation's endemic skills gap. The Bureau of Labor Statistics forecasts another 3.4 million manufacturing jobs (i.e. skilled workers) will be needed over the next decade. Simply fixing this skills gap through Apprenticeship program developments could help employers meet their immediate workforce needs while also preparing the next generation of productive workers.

U.S. Advanced Manufacturers will face a range of significant challenges in the coming decade: automation through robotics, skills shedding from the retirement of baby boomers as well as increased global competition in low complexity manufacturing. For the U.S and Tennessee to remain competitive, we must stop allowing trade competitors to steal our supply chain. We must embrace Apprenticeship programs as a resolution to fill our skills gap shortage. As indicated by all 20 employers that Roane State visited, the largest fear/challenge of each employer is a trained workforce.

It is worth repeating, the time is right for Tennessee to make the move to put together a state-wide Apprenticeship program. Employers are ready, education is ready and the state is ready. We need to remain competitive, provide employers with the skilled workforce they need and prepare the workforce for future workforce challenges. Earn-and-learn is a winning scenario for those entering the workforce today as well as those tooling up for their careers of tomorrow. Roane State Community College stands ready to accept the challenge of assisting Tennessee with the development of their Apprenticeship Program.

## **Attachments**

- Attachment A – Advanced Manufacturing Employer Questionnaire
- Attachment B – Employer Visit Survey Spreadsheet
- Attachment C – Stakeholder Meeting Presentation
- Attachment D – Stakeholder Survey
- Attachment E – Stakeholder Survey Spreadsheet
- Attachment F – Anderson County Stakeholder Meeting
- Attachment G – Roane County Stakeholder Meeting
- Attachment H – Oak Ridge Stakeholder Meeting
- Attachment I – Loudon County Stakeholder Meeting
- Attachment J – Central Piedmont Best Practices
- Attachment K – Central Piedmont Apprenticeship PowerPoint
- Attachment L – Greenville Best Practices
- Attachment M – Harper Best Practices
- Attachment N – Community College Offering Alignment Spreadsheet
- Attachment O – Hiring Trends Based on Occupations