



*"Building SE Wyoming's Manufacturing Workforce"*

Proposal for the Development of an  
Advanced Manufacturing & Materials Center (AMMC)  
Executive Summary

## Introduction

Manufacturing as an industry is growing strong again in the United States, and this trend is predicted to continue well beyond the current COVID-19 pandemic. Manufacturers are growing, investing, and hiring according to the National Association of Manufacturers (NAM). However, in 2019 the association reported that 77% of manufacturers said they had positions going unfilled for the lack of qualified applicants. These unfilled positions are the result of the burgeoning skills gap that is being heightened by the rapid adoption of new technology, the retirement of baby boomers, and the difficulty of recruiting skilled youth into the industry. This pressure will only increase as companies work to expand, bring off-shore operations back to America, and working-age populations remain un-addressed.

Wyoming is positioned well to embrace the next wave of American manufacturing progress. First, the field has become a strategic focus for many initiatives within the state. The 2018 Economically Needed Diversification Opportunities for Wyoming (ENDOW) “Transforming Wyoming” 20-year Economic Diversification Strategy identified Advanced Manufacturing as one of the “Next Generation Engines” to build the new diversified economy for the state.

More recently, Cheyenne’s F.E. Warren Air Force Base was announced as one of three bases to be the center of the Ground Based Strategic Deterrent (GBSD) project which increases the immediate need for a skilled manufacturing workforce. It is projected that 1,000 new jobs will be created by this project, with many of those requiring the skill sets addressed through Advanced Manufacturing training. F.E. Warren will be the first base to go through this significant upgrade. Local companies are poised to receive 6% of the manufacturing set aside associated with this project. This long-term project will change the face of Advanced Manufacturing in Wyoming’s Southeast region.

Finally, Laramie County, and southeast Wyoming in general, has been determined to be an ideal location for manufacturers to start or expand operations. The proximity to critical transportation infrastructure, availability of affordable “shovel-ready” land, favorable tax environment, and the proximity to the growing Front Range of Colorado, all position the area as an ideal growth opportunity. According to Cheyenne LEADS, Laramie County’s economic development organization, the vast majority of current expansion/relocation prospects they are working with are part of the manufacturing industry.

The number one issue that will determine the success of growing a manufacturing industry in SE Wyoming is the availability of a trained, qualified workforce, as indicated by local manufacturers within the region. Laramie (located 45 miles from Cheyenne) has formed a Next Generation Manufacturing Partnership to help address this issue. In addition, the current and pending shortage of a skilled labor force, especially skilled machinists, in Wyoming’s Southeast region has been voiced by local manufacturers and by companies that have chosen not to locate in the region. Anticipation of the GBSD project amplifies this concern as there will be an extensive need for machinists for the expansive project. At this time, no cohesive pipeline or program exists for the development of an Advanced Manufacturing workforce in the region. Laramie County Community College (LCCC) recognizes the need and is making the development of Advanced Manufacturing programs and services a high priority.

## Purpose

The purpose of this initiative is to establish an Advanced Manufacturing and Materials Center (AMMC) in Southeast Wyoming. The AMMC will provide a broad range of education and training offerings to develop, advance, and build the workforce necessary to meet current and future needs, with the ultimate goal of diversifying the state's economy through the growth of the Advanced Manufacturing industry, and providing Wyoming citizens with access to high-skill, high-wage career choices. This document is intended to provide an executive summary of the need, potential programming, possible funding opportunities, and budget necessary to establish the AMMC.

## Programming

Based on surveys of regional employers conducted by LCCC, along with industry trend data, programming for the Advanced Manufacturing and Materials Center will focus on two key areas; Machining (including metrology), and Additive Manufacturing (including materials and metallurgy). The key skills to be taught will include: Shop math, print reading, safety, manual milling and turning, cutting tools, ISO/quality assurance, Lean, Project Management Associate certification preparation, various OSHA and safety training, hand measurement, Coordinate Measurement Machine (CMM), Geometric Dimensioning and Tolerancing (GD&T), CNC milling and turning, routine maintenance, CAD/CAM (Mastercam), 3D modeling (Solid Works), and metal and plastic additive manufacturing.

Curriculum will be designed and offered in both non-credit and credit areas. Initial programming will focus on non-credit training to be offered at three levels: Introduction, Intermediate, and Advanced Machining. An additional 32-credit hour certificate will be available in order to complete the level of machining instruction requested (mainly introduction and intermediate skill levels) in a one-year certificate program. Additive Manufacturing would require an additional semester for both non-credit and credit options. A compressed non-credit curriculum (apprenticeship model) will be developed that can be easily transferred to credit and will provide credit for prior learning opportunities for our students, as well as stackable credentials. Additional programming, which may include tacks to bachelor's degrees at the University of Wyoming or applied bachelor's degrees offered by a community college, will be added over time. Finally, through coordination with businesses within the region, the AMMC will promote apprenticeships and on-the-job training opportunities for students to advance their skills within a business-specific scope.

In addition, a makerspace will be included in the AMMC, that will assist with rapid prototyping for emerging manufacturers and entrepreneurs. The makerspace will be utilized by both LCCC students and the community as a whole, with plans to provide options for community use via a day pass, monthly pass, or yearly pass. The ongoing AMMC mission/goal will be to blend the skills employers need now with future needs that will result from the GBSD and other related projects.

## Locations and Facilities

Manufacturing is an equipment- and space-intensive enterprise. Providing the right facilities and the current technology/equipment will be essential for the success of the AMMC. Unfortunately, LCCC currently lacks both of these elements. Investments and solutions for both will be necessary to implement this initiative.

While there are various opportunities for locations to build a facility, as well as the acquisition and/or repurposing of existing facilities within LCCC's service area, none are currently located on the College's campus or are assets currently owned by LCCC. Thus, one of three likely options are needed for this project to succeed: (1) renovate an existing facility on LCCC property for the center; (2) enter into a build to suit arrangement with a third party to construct a new facility and lease to LCCC; or (3) lease or have donated, and renovate an existing facility that would meet the needs identified in this document.

Based on a preliminary space needs analysis completed by subject matter expert George Newman (former Director of the Front Range Community College Center for Integrated Manufacturing in Longmont, CO), in order to develop a comprehensive facility in Cheyenne, WY, a minimum 14,500 square foot facility is needed. This includes space for both

machining, additive manufacturing, and a makerspace/fabrication laboratory. A more extensive analysis will be completed once the final building/space has been identified. Possible existing locations are currently being vetted.

### Equipment, Start-Up and Operating Costs

A proposed listing of equipment needs has been established to include all items necessary for Machining, Metrology, Materials and Metallurgy, and Additive Manufacturing. (See Attachment A for equipment details.) These costs have been combined with the estimated start-up, capital and operating costs for both an on-campus and off-campus facility. The total three-year projected cost for the AMMC located on the LCCC campus is \$5,580,213.44. For an off-campus facility location, the estimated three-year projected cost would be \$5,419,315.85. Detailed costs are broken out in the table below.

Advanced Manufacturing and Materials Center		
	On Campus	Off Campus
Start-Up Costs	\$279,141.37	\$384,022.44
Equipment/Capital Costs	\$4,167,535.00	\$3,167,535.00
3-Year Operating Costs	\$1,133,537.07	\$1,867,758.41
<b>Totals</b>	<b>\$5,580,213.44</b>	<b>\$5,419,315.85</b>

### Funding

The success of the AMMC as a start-up will be dependent on the ability to secure sufficient funding from a variety of sources. Potential sources include grants, state/local funding or other contributions, and private/corporate gifts. During the last session of the State Legislature, the state committed roughly \$750,000 in matching funds available for this project. LCCC has already successfully matched these funds with private gifts, resulting in a total of \$1.5 million in funding currently on hand.

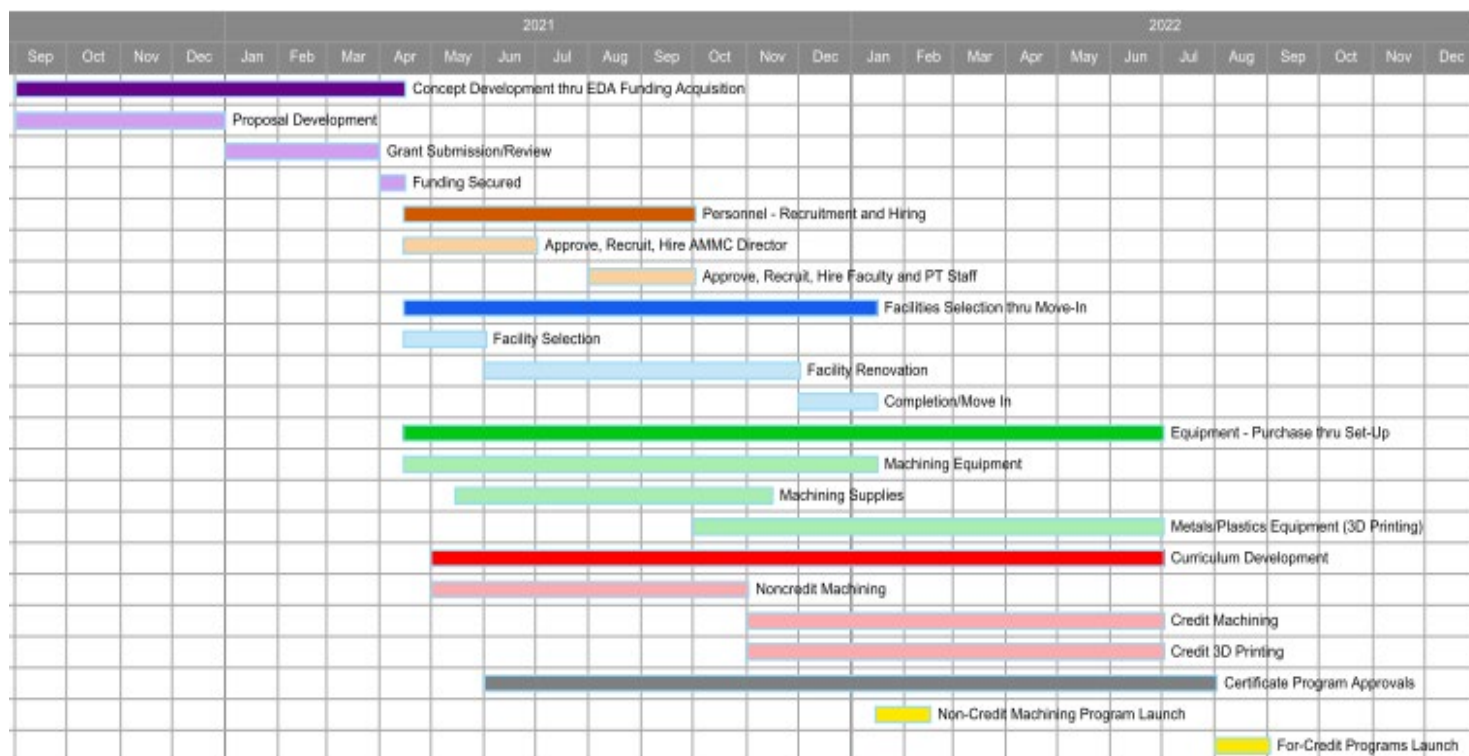
In addition to these funds, the College will seek assistance through federal grants, specifically an Economic Development Administration (EDA) grant that could cover upwards of three million dollars with an anticipated 50:50 match. Funding from the EDA would be primarily used for equipment, facilities, and start-up expenditures. LCCC would also seek additional funding through the Department of Workforce Services for assistance with tuition costs and related expenses for the initial students enrolled in programming at the AMMC.

Currently there are no specific funding options identified for the acquisition/lease/renovation of facilities. The options for funding the facilities component of this project would include state appropriations, donation/gift of a facility to LCCC, a lease-revenue or P3 arrangement, or a combination of the above. Depending on the options, facilities costs are estimated to be somewhere between \$10 and \$12 per square foot annually to lease, with anticipated renovation costs built into the pro forma below.

### Timeline

A grant application for EDA funding will be submitted in January 2021, with the assumption of award approval by April 2021. Upon award acceptance, and assuming all match is on hand, a general timeline has been created for this project. The process of hiring the AMMC Director will begin immediately upon award receipt, with an aggressive start date anticipated on July 1, 2021. All other staff hiring will follow and conclude by October 2021. Facility selection will occur in tandem, and progress as quickly as possible assuming minimal renovation or complexities with acquisition. Equipment will also be purchased within this timeframe, with an anticipated completion/move-in date in early January 2022. This will be closely followed by the commencement of non-credit Machining classes in late January 2022. Additive Manufacturing curriculum development will follow, as well as for-credit Machining transition with the assumption that these classes will begin in Fall 2022. It is anticipated that an official AMMC Open House will take place during Manufacturing Day 2022. A timeline is provided in the figure below.

**Figure. AMMA Estimated Start-Up Timeline**



## Pro Forma

A summary start-up and three-year operating proforma analysis is provided in the tables immediately below that include options for either an on-campus or off-campus location. They capture the anticipated expenditures and revenue for non-credit and credit programming (including the makerspace) for the AMMC. A table with estimated enrollments and completions immediately follows. A comprehensive, detailed Pro Forma for both options is provided as Attachment B.

AMMC – Three Year Pro Forma (On-Campus)					
	Start-Up	Year One	Year Two	Year Three	Total
Total Expenditures	\$4,446,676.37	\$277,742.97	\$417,130.76	\$438,663.34	\$5,580,213.44
Total Revenue	\$4,619,072.00	\$289,290.00	\$508,965.00	\$506,587.50	\$5,923,914.50
Over/Under	\$172,395.63	\$11,547.03	\$91,834.24	\$67,924.16	\$343,701.06

AMMC – Three Year Pro Forma (Off-Campus)					
	Start-Up	Year One	Year Two	Year Three	Total
Total Expenditures	\$3,551,557.44	\$520,829.15	\$661,854.83	\$685,074.43	\$5,419,315.85
Total Revenue	\$4,619,072.00	\$289,290.00	\$508,965.00	\$506,587.50	\$5,923,914.50
Over/Under	\$1,067,514.56	(\$231,539.15)	(\$152,889.83)	(\$178,486.93)	\$504,598.65

AMMC – Three Year Enrollments and Completions					
	Start-Up	Year One	Year Two	Year Three	Total
Enrollments	-	112	216	272	600
Completions	-	84	160	202	446

## Attachment A

AMMC Equipment List					
Machine	Mfg	Model	Qty	Cost	Total
<b>Machining</b>					
Bench			8	\$2,000	\$16,000
CNC Turning Center (Lathe)	HAAS	TL-1	7	\$33,080	\$231,560
CNC Turning Center (Lathe)	HAAS	ST-10	1	\$97,720	\$97,720
-Tooling for CNC Lathe			8	\$15,000	\$120,000
CNC Milling Machine	HAAS	TM-1P-4axis	7	\$58,860	\$412,020
CNC Milling Machine	HAAS	VF-3-4 axis	1	\$108,595	\$108,595
CNC Milling Machine-Robotic Option	HAAS	PKG-1	1	\$49,995	\$49,995
-Tooling for CNC Milling Machine			8	\$15,000	\$120,000
CNC Trainer	HAAS		16	\$0	\$0
Computers for initial programming			16	\$2,000	\$32,000
Drill Press	Jet	354400 +vise	2	\$1,000	\$2,000
Horizontal band saw (7 x 12)	Kent USA		1	\$1,200	\$1,200
Manual Lathe	South Bend	SB1013F+chuck/tool post/holder	8	\$22,395	\$179,160
Manual Milling Machine	Acer	3VKH+Newell DRO/Kurt 6" vise	8	\$13,595	\$108,760
Pedestal Grinder	Baldor	712 +Jet 577712 pedestal	2	\$825	\$1,650
Manual Hand Feed Surface Grinder	Kent USA	KGS 618	2	\$11,000	\$22,000
Miscellaneous hand tools+shop carts					\$30,000
Air Compressor	Quincy	QGS-20 w/dryer and start up	2	\$17,500	\$35,000
<b>Subtotal this area</b>					<b>\$1,567,660</b>
<b>Metrology, Materials &amp; Metallurgy</b>					
Universal Hardness Testers, Brinell, Rockwell ...	Tinius Olsen		4	\$10,000	\$40,000
Coordinate Measuring Machine (CMM)	Zeiss	O-Inspect	1	\$59,000	\$59,000
Micrometer Kit			18	\$600	\$10,800
Digital Micrometer			18	\$150	\$2,700
Caliper			18	\$80	\$1,440
Digital Caliper			18	\$120	\$2,160

Heat Treating Equipment			0		
Height Gauge			6	\$800	\$4,800
Depth Gauge (or Micrometer)			6	\$400	\$2,400
Microscope			2	\$3,500	\$7,000
Universal Test System	MTS	Criterion C45-105	1	\$125,000	\$125,000
Surface plate- 18" x 12" x 3" w/stand			4	\$1,500	\$6,000
Surface plate- 60" x 36" x 8" w/stand			1	\$5,000	\$5,000
<b>Subtotal this area</b>					<b>\$266,300</b>
<b>Additive Manufacturing</b>					
Industrial System	Markforged	X7	1	\$69,000	\$69,000
Industrial System	EOS	M100	1	\$199,000	\$199,000
Wire EDM Machine	Kent USA		1	\$95,000	\$95,000
Wire EDM Tooling			1	\$15,000	\$15,000
5-Axis Mill	Haas	UMC-500	1	\$137,575	\$137,575
5-Axis Mill Tooling			1	\$20,000	\$20,000
CADD – 3D modeling Computers			16	\$3,000	\$48,000
3D Printer / Rapid Prototype Machine	Stratasys		2	\$50,000	\$100,000
<b>Additive Manufacturing Subtotal</b>					<b>\$683,575</b>
<b>Equipment Total Cost</b>					<b>\$2,517,535</b>

## Attachment B

AMMC - Start-up and Operating Budget – EXPENSES (On Campus Location)					
	Start Up	Year 1	Year 2	Year 3	Total
<b>Estimated Enrollment (does not include maker's space)</b>		112	216	272	600
<b>Program Expenditures</b>					
<b>Personnel Costs</b>					
<b>Full Time</b>					
Program Director - FT (6 Mo in Start Up, 2% annual increase after Y1)	\$36,000.00	\$72,000.00	\$73,440.00	\$74,908.80	\$256,348.80
Faculty (Category C)	\$0.00	\$0.00	\$68,000.00	\$69,360.00	\$137,360.00
Fringe Benefits (Full Time at 35%)	\$12,600.00	\$25,200.00	\$49,504.00	\$50,494.08	\$137,798.08
<b>Part Time</b>					
Maintenance PT (6 Mo in Start Up, 2% annual increase after Y1)	\$9,360.00	\$18,720.00	\$19,094.40	\$19,476.29	\$66,650.69
Maker's Space Coordinator (19.5 hours at \$20 hour)	\$8,775.00	\$17,550.00	\$17,550.00	\$17,550.00	\$61,425.00
Adjunct Faculty (Technical & GER)	\$0.00	\$14,000.00	\$47,051.20	\$59,102.40	\$120,153.60
Administrative (19.5 hours week at \$15 hour)	\$18,135.00	\$13,162.50	\$13,162.50	\$13,162.50	\$57,622.50
Fringe Benefits (Part Time)	\$2,756.52	\$4,820.87	\$7,361.22	\$8,306.13	\$23,244.74
<b>Total Personnel Costs</b>	<b>\$87,626.52</b>	<b>\$165,453.37</b>	<b>\$295,163.32</b>	<b>\$312,360.20</b>	<b>\$860,603.41</b>
<b>Operating Costs</b>					
Marketing	\$10,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$16,000.00
Custodial / Grounds	\$0.00	\$23,200.00	\$23,896.00	\$24,612.88	\$71,708.88
Educational Supplies	\$0.00	\$1,600.00	\$4,200.00	\$4,800.00	\$10,600.00
Operational Supplies	\$52,000.00	\$77,400.00	\$79,722.00	\$82,113.66	\$291,235.66
Utilities	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Monthly Rent/Lease	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Other (Building Maintenance)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Security Cameras and Monitoring	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Other Services (internet)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
<b>Total Operating Costs</b>	<b>\$62,000.00</b>	<b>\$104,200.00</b>	<b>\$109,818.00</b>	<b>\$113,526.54</b>	<b>\$389,544.54</b>
<b>Equipment/Capital Costs</b>					
Manufacturing Equipment	\$2,517,535.00	\$0.00	\$0.00	\$0.00	\$2,517,535.00
Makerspace Equipment	\$150,000.00	\$0.00	\$0.00	\$0.00	\$150,000.00
Facilities Renovation (TBD)	\$1,500,000.00	\$0.00	\$0.00	\$0.00	\$1,500,000.00
<b>Total Equipment/Capital Costs</b>	<b>\$4,167,535.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$4,167,535.00</b>
<b>Indirect Costs</b>					
Indirect Costs at 3%	\$129,514.85	\$8,089.60	\$12,149.44	\$12,776.60	\$162,530.49
<b>Total Program Expenditures</b>	<b>\$4,446,676.37</b>	<b>\$277,742.97</b>	<b>\$417,130.76</b>	<b>\$438,663.34</b>	<b>\$5,580,213.44</b>



AMMC - Start-up and Operating Budget – EXPENSES (Off Campus Location)					
	Start Up	Year 1	Year 2	Year 3	Total
<b>Estimated Enrollment (does not include maker's space)</b>		112	216	272	600
<b>Program Expenditures</b>					
<b>Personnel Costs</b>					
<b>Full Time</b>					
Program Director - FT (6 Mo in Start Up, 2% annual increase after Y1)	\$36,000.00	\$72,000.00	\$73,440.00	\$74,908.80	\$256,348.80
Faculty (Category C)	\$0.00	\$0.00	\$68,000.00	\$69,360.00	\$137,360.00
Fringe Benefits (Full Time at 35%)	\$12,600.00	\$25,200.00	\$49,504.00	\$50,494.08	\$137,798.08
<b>Part Time</b>					
Maintenance PT (6 Mo in Start Up, 2% annual increase after Y1)	\$9,360.00	\$18,720.00	\$19,094.40	\$19,476.29	\$66,650.69
Maker's Space Coordinator (19.5 hours at \$20 hour)	\$8,775.00	\$17,550.00	\$17,550.00	\$17,550.00	\$61,425.00
Adjunct Faculty (Technical & GER)	\$0.00	\$14,000.00	\$47,051.20	\$59,102.40	\$120,153.60
Administrative (19.5 hours week at \$15 hour)	\$18,135.00	\$13,162.50	\$13,162.50	\$13,162.50	\$57,622.50
Fringe Benefits (Part Time)	\$2,756.52	\$4,820.87	\$7,361.22	\$8,306.13	\$23,244.74
<b>Total Personnel Costs</b>	<b>\$87,626.52</b>	<b>\$165,453.37</b>	<b>\$295,163.32</b>	<b>\$312,360.20</b>	<b>\$860,603.41</b>
<b>Operating Costs</b>					
Marketing	\$10,000.00	\$2,000.00	\$2,000.00	\$2,000.00	\$16,000.00
Custodial / Grounds	\$0.00	\$23,200.00	\$23,896.00	\$24,612.88	\$71,708.88
Educational Supplies	\$0.00	\$1,600.00	\$4,200.00	\$4,800.00	\$10,600.00
Operational Supplies	\$52,000.00	\$77,400.00	\$79,722.00	\$82,113.66	\$291,235.66
Utilities	\$15,602.50	\$31,206.00	\$32,142.18	\$33,106.45	\$112,057.13
Monthly Rent/Lease (AMMC/Makerspace) @\$12,100 mo (Lease \$12 per sq foot at 15,000 sq ft)	\$90,000.00	\$180,000.00	\$180,000.00	\$180,000.00	\$630,000.00
Other (Building Maintenance)	\$9,200.00	\$18,400.00	\$18,952.00	\$19,520.56	\$66,072.56
Security Cameras and Monitoring	\$3,650.00	\$3,400.00	\$3,502.00	\$3,607.06	\$14,159.06
Other Services (internet)	\$12,500.00	\$3,000.00	\$3,000.00	\$3,000.00	\$21,500.00
<b>Total Operating Costs</b>	<b>\$192,952.50</b>	<b>\$340,206.00</b>	<b>\$347,414.18</b>	<b>\$352,760.61</b>	<b>\$1,233,333.29</b>
<b>Equipment/Capital Costs</b>					
Manufacturing Equipment	\$2,517,535.00	\$0.00	\$0.00	\$0.00	\$2,517,535.00
Makerspace Equipment	\$150,000.00	\$0.00	\$0.00	\$0.00	\$150,000.00
Facilities Renovation (TBD)	\$500,000.00	\$0.00	\$0.00	\$0.00	\$500,000.00
<b>Total Equipment/Capital Costs</b>	<b>\$3,167,535.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$0.00</b>	<b>\$3,167,535.00</b>
<b>Indirect Costs</b>					
Indirect Costs at 3%	\$103,443.42	\$15,169.78	\$19,277.33	\$19,953.62	\$157,844.15
<b>Total Program Expenditures</b>	<b>\$3,551,557.44</b>	<b>\$520,829.15</b>	<b>\$661,854.83</b>	<b>\$685,074.43</b>	<b>\$5,419,315.85</b>

AMMC - Start-up and Operating Budget - REVENUES					
	Start Up	Year 1	Year 2	Year 3	Total
<b>Program Revenues</b>					
<b>Tuition &amp; Fees</b>					
Tuition & Fees (Non-Credit Training Other) <sup>(1)</sup>	\$0.00	\$8,000.00	\$12,000.00	\$16,000.00	\$36,000.00
Tuition & Fees (Non-Credit Technical Training)	\$0.00	\$67,200.00	\$176,400.00	\$201,600.00	\$445,200.00
Tuition & Fees (Tuition, Fees, and State Reimbursement)	\$0.00	\$0.00	\$81,810.00	\$109,080.00	\$190,890.00
Makerspace Membership/Classes	\$0.00	\$48,590.00	\$60,755.00	\$76,907.50	\$186,252.50
<b>Total Tuition &amp; Fees</b>	<b>\$0.00</b>	<b>\$123,790.00</b>	<b>\$330,965.00</b>	<b>\$403,587.50</b>	<b>\$858,342.50</b>
<b>Other Revenue</b>					
Industry Contributions	\$3,000.00	\$3,000.00	\$3,000.00	\$3,000.00	\$12,000.00
<b>Grants</b>					
EDA	\$2,500,000.00	\$0.00	\$0.00	\$0.00	\$2,500,000.00
Union Pacific Grant	\$62,500.00	\$62,500.00	\$0.00	\$0.00	\$125,000.00
Perkins Funds	\$100,000.00	\$100,000.00	\$100,000.00	\$0.00	\$300,000.00
Other Grants (TBD)	\$500,000.00	\$0.00	\$0.00	\$0.00	\$500,000.00
Wyoming Works	\$25,000.00	\$0.00	\$0.00	\$0.00	\$25,000.00
LCCC Reallocated Funds	\$0.00	\$0.00	\$75,000.00	\$100,000.00	\$175,000.00
State Matching Funds	\$714,286.00	\$0.00	\$0.00	\$0.00	\$714,286.00
LCCC Foundation Match	\$714,286.00	\$0.00	\$0.00	\$0.00	\$714,286.00
<b>Total Other Revenue</b>	<b>\$4,619,072.00</b>	<b>\$165,500.00</b>	<b>\$178,000.00</b>	<b>\$103,000.00</b>	<b>\$5,065,572.00</b>
<b>Total Program Revenue</b>	<b>\$4,619,072.00</b>	<b>\$289,290.00</b>	<b>\$508,965.00</b>	<b>\$506,587.50</b>	<b>\$5,923,914.50</b>

<sup>1</sup> To include workshops such as Six Sigma, PMA certification, ISO, CAD/Solidworks and OSHA