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CLCR's Vision and Approach to Education and Manufacturing

We believe that advanced manufacturing represents the highest possible fusion of public and private interests in a number of compelling ways;

- Is the only sector that can build a large middle class—a pre-requisite for a sustainable society and strong communities. For example, in Illinois manufacturing jobs average pay is \$64,000 when you include benefits, compared to \$31,000 for the service sector, and \$17,000 for retail. Each manufacturing job generates at least 3 other jobs in the economy while service and retail, at best, generate one other job.
- Is the sector that can solve the environmental crisis. It will be engineers and industrial developers who will finally develop the products and processes that can restore our environment rather than lawyers suing companies with bad practices or government regulation. Both of the latter are essential but not sufficient;
- Work is transforming not toiling. As low skill, toiling jobs in manufacturing go off-shore, work in modern manufacturing can be interesting and personally transforming—despite public opinion to the contrary. Advanced manufacturing requires employees at all levels that not only have math and computer skills, but also the ability to think critically, communicate effectively, and work in teams. Work in advanced manufacturing builds the individual during work as well as offers a good standard of living after work. We also are committed to manufacturing careers outside of the particular company including lawyers engaged in intellectual property rights, Ph.D. researchers in nanotechnology, policy analysts, labor and political leaders, and all those required for our society to return to a foundation of production and innovation rather than the pursuit of high returns in the shortest amount of time that characterized the last 30 years.

The Manufacturing Renaissance Council model is driven by several distinctive features in relation to communities as well as secondary and post-secondary education.

A Focus on Low Income Communities: We know our approach is relevant to our whole society and can contribute to rebuilding every aspect of our society and every community. On the other hand, we intentionally prioritize low income communities of color for our projects in education and community development. These are often the communities that were first de-industrialized and should be at the front lines of any recovery. We also want to demonstrate that our approach to economic development applies to every community, not just those with the greater resources.

Multiple Pathways: We believe in the Multiple Pathway approach that integrates an integrated core academic program, an integrated core career technical curriculum, work-based learning opportunities, and student support. For example, Austin Polytech offers a standard college prep curriculum including Advanced Placement calculus. All students take four years of Project Lead the Way—a nationally-recognized pre-engineering curriculum. Our students also take an advanced machining class that vividly demonstrates the connection between concept, design, and product; as well as preparing the students for success in securing nationally-recognized credentials in metalworking (NIMS). A NIMS credential can qualify our students for high paying part-time, summer, or full-time jobs. We have a special relationship with City Colleges of Chicago and are now working through the details of dual credit and dual

enrollment, and a close working relationship to encourage our students to pursue a college degree program.

Education linked to Work Experience: We believe that work experience through internships, summer, and part-time jobs are a powerful complement to education rather than a distraction. Contextual education has proven to be effective in accelerating learning and motivation. Work experience at Austin Polytech gives students the opportunity to perhaps work at the company and with the people at all levels in the firm where they may find a career. A number of our company partners are willing to pay for a college education for their employees expecting them to advance to higher positions. S&C Electric will pay for education up to a Ph.D. with 100% reimbursement if the employee makes A's or B's. John Winzler, President of Winzeler Gear will pay for education including college for his employees. He loves Austin Polytech because if graduates come to his company, they will be looking for a career not just a pay check and will take advantage of continuing education opportunities. Work opportunities also provide income—essential for the students who come from the communities of our focus.

Ownership and Entrepreneurship: Despite public perception, 90% of manufacturing companies have less than 100 employees and are typically privately held. A major challenge facing privately-held manufacturing companies across the country is the issue of succession of ownership. The overwhelmingly percentage of owners of manufacturing companies (98% in Chicago) are white owned. As owners of baby boom age prepare to retire from these small companies, often the next generation doesn't want to return to the challenges of small production. If they seek a career in business, it's often in the finance and investment community. Many of these companies close because they are below the public radar screen and don't attract new owners. CLCR completed a study of 800 companies with a principal who was 55 years or older found that 40% were at risk of closing only because of this issue of succession. These companies represent, in their aggregate, the lifeblood of the local manufacturing economy. This crisis represents an opportunity for young people, particularly of color. A feature of our approach to education is to actively promote this opportunity knowing that it represents an enormous motivation for students who are entrepreneurial. This aspect of our program is a feature that attracts small companies as partners. They are eager to have a next generation willing and able to take the reins of their company. And this is a feature attractive to communities who know the value of local ownership—a common feature of communities in the past. Austin Polytech is inspired by a high school—Aldini Valeriani—in Bologna Italy that is similarly connected to the packaging machinery industry. 15% of its graduates finally become owners of companies and the quality of the school attracts companies to site in the immediate community because they know they have a predictable pool of talent for employees at all levels of the firm.

Engaging employers and leveraging their investment in the public: At the heart of the MRC model is developing a public sector that is a competent partner for a section of the private sector that we believe is essential for a sustainable society. This can't be a one-way relationship. Employers must be equally engaged in the programs that benefit the public. For example, at Austin Polytech, we have 60 school partners consisting mostly of small privately-held companies but also larger companies and John Marshall Law School. These partners are:

- Providing opportunities for student with plant tours, job shadowing, internships and summer jobs;
- Providing direct support to the school and its programs. Companies contributed over \$250,000 in the last two years for machinery, a full-time instructor and other support for public education on the West Side of Chicago in the middle of the worst recession in decades;
- Assistance to teachers in developing program and curriculum. We have a Teacher Manufacturing Mentor program with manufacturers meeting with individual teachers in all disciplines to find

creative ways to integrate manufacturing and its various themes into teaching. One partner, John Marshall Law School, has been providing a professor who provides regular sessions on intellectual property rights and patents for the engineering class. John Marshall has now developed its own class for law students to work with APA student on these issues. We see a lawyer doing intellectual property rights as a manufacturing career.

National Certifications: We believe that nationally-recognized certifications are an important feature in secondary and post-secondary education to ensure that students have the widest possible range of good career and employment opportunities. We first came to understand their significance in an influential study tour we took in 2000 to Germany and Denmark where all salaried and hourly occupations have national skill standards and a universally accepted way to certify that someone can meet those standards.

In the United States, skill certification systems are relatively new in manufacturing and often associated with very traditional vocational education. In our project, we have focused on the National Association of Manufacturers-Endorsed Skill Certification System. We believe this is an important new approach to educational reform, aligned directly to high quality, middle class careers in Advanced Manufacturing. The first “release” of the Skills Certification System does focus on entry-level, foundational academic, general workplace, and technical competencies and skills that have been identified as crucial to rebuilding our technical workforce in the U.S. It also includes credentials for the Society of Manufacturing Engineers—an association of those who run and operate companies among other occupations. The deployment of the Skills Certification System has been primarily in community colleges’ for-credit programs of study, so that students and transitioning workers can gain postsecondary credentials (third party validated) with real value in the manufacturing workforce while banking credits toward Associates and higher level degrees. This system of nationally portable, industry-recognized credentials has been described as an “Applied STEM” educational pathway that: (1) often accelerates the pathway from high school to community colleges via dual enrollment or the early college model; (2) provides more “on” and “off” ramps to postsecondary education for working learners; and, (3) provides postsecondary credentials recognized and valued in the manufacturing job market. The System has been supported by both the Gates Foundation and Lumina Foundation for Education, with financial assistance to accelerate deployment in 17 states. There is much interest in California, from the California School Board Association to the community college and Cal State leadership to major manufacturers and industry associations.