

# MICHIGAN'S FORGOTTEN MIDDLE-SKILL JOBS

MEETING THE DEMANDS OF A 21<sup>ST</sup>-CENTURY ECONOMY

OCTOBER 2009



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## EXECUTIVE SUMMARY

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When most people think of jobs in Michigan, they think first of the auto industry. It's a sector filled with the kinds of middle-skill jobs that built the American middle class in the 20th century: family wage jobs with great benefits that don't require a college degree. Michigan's jobs are more than just the auto industry, though. Agriculture and forestry, tourism, advanced manufacturing, aerospace and renewable energy all play an important role in our state's economy.

Today, Michigan's economy and our labor market are in the midst of seismic change. Auto manufacturing has been spreading to other states, and the "Big Three" American car companies are going through major restructuring. While auto manufacturing jobs are declining as a share of the larger state economy, one thing will not change. **Middle-skill jobs represent the largest share of jobs in Michigan—some 51 percent—and the largest share of future job openings.**

Middle-skill jobs are those that require more than a high school diploma but less than a four-year degree. Prior to the recession, Michigan was already experiencing shortages of middle-skill workers in crucial industries. Much of the job creation fostered by the American Recovery and Reinvestment Act will be in middle-skill jobs. With rising unemployment in the state, this is precisely the time to ensure we are training the middle-skill workforce that will be critical to our economic recovery and long-term success.

How our state fares as it goes through major economic changes depends in part on whether we can prepare our workforce for the jobs of the future. Today, there are gaps in the skills of our workforce and in our training and education policies that threaten to undermine our strengths.

Addressing the need for middle-skill workers will require attention not only to educational opportunities for young people, but also for those already in the workforce. **Sixty-four percent of the people who will be in Michigan's workforce in the year 2020 were already working adults in 2005—long past the traditional high school-to-college pipeline.**

Who are middle-skill workers? They are the construction workers who build and repair our homes, bridges, and roads. The health care technicians who care for us and our loved ones. Truckers who keep our stores supplied. Police and firefighters who keep us safe.

Federal funds from the stimulus bill are expected to create millions of new jobs and many of these will be middle-skill, especially in green jobs, construction, manufacturing and transportation. Matching the skills of our workforce to meet this demand will help our economy recover more quickly and prepare us for better times ahead. But it doesn't end there. Retirement of large numbers of baby boomers will keep demand for middle-skill workers high for years to come.

Michigan has made significant investments in education and training for our workforce through programs like the No Worker Left Behind initiative. The state must continue proactive policy actions to align our workforce and education resources to better meet the state's labor market demand. We must also make significant investments in training programs that will train many more Michigan residents—laid off workers, workers in low-wage jobs, potential workers with low basic skills—for better, more plentiful middle-skill jobs and careers.

If we are to realize our state's full economic potential, educational access must reflect the demands of a 21st-century economy and the realities of the 21st-century workforce. The following vision can shape our state's workforce and education policies and investments to meet these 21st-century realities:

***Every Michigander should have access to the equivalent of at least two years of education or training past high school—leading to a vocational credential, industry certification, or one’s first two years of college—to be pursued at whatever point and pace makes sense for individual workers and industries. Every person must also have access to the basic academic and workplace skills needed to pursue such education.***

Michigan’s No Worker Left Behind initiative provides just this kind of middle-skill training guarantee for low-income unemployed workers. After only two years, enrollment is about to surpass the Governor’s original goal of reaching 100,000 workers in need of retraining. While this is an important first step, we must build on this guarantee and expand it to include all citizens in our state.

Businesses, labor, educators, community-based organizations and others must work together on this ambitious goal. Policymakers must step in with strong political leadership and commitment to ensure that Michigan has the middle-skill workforce we need to recover and thrive.



## INTRODUCTION

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When most people think of jobs in Michigan, they think first of the auto industry. It's a sector full of the kinds of middle-skill jobs that built the American middle class in the 20th century: family wage jobs with great benefits that don't require a college degree. Michigan's jobs are more than just the auto industry, though. Agriculture and forestry, tourism, advanced manufacturing, aerospace and renewable energy all play an important role in our state's economy. Their share of our state's economy will only continue to grow as auto manufacturing declines.

With a gross state product of almost \$380 billion in 2007,<sup>1</sup> Michigan has the twelfth largest state economy in the nation. In its most recent report on states best positioned to succeed in the new economy, the Kauffman Foundation ranked Michigan as number 17, having risen in those ranks from 34 in 1999.<sup>2</sup> Industry investment in research and development is the second highest in the nation, and continues to grow faster than in most other states.<sup>3</sup>

Today, Michigan's economy and our labor market are in the midst of seismic change. Auto manufacturing has spread to other states over several years, and the "Big Three" American car companies are going through major structural changes. While auto manufacturing jobs are declining as a share of the larger state economy, one thing will not change: middle-skill jobs are and will be the largest share of jobs in Michigan into the foreseeable future.

New research on projected job openings and on retirement trends in the workforce shows that the largest share of jobs in Michigan today is in fact **middle-skill jobs**. On top of that, funds from the American Recovery and Reinvestment Act (ARRA, also known as the Recovery Act) are expected to increase the number of middle-skill jobs in our state and nationwide. Middle-skill jobs are those that require more than a high school diploma but less than a four-year degree. The data further show that middle-skill jobs will make up the largest segment of Michigan's total labor market in the foreseeable future.

Eighty-seven percent of us have at least a high school degree, above the national average, while almost 25 percent have a college degree or more, below the national average.<sup>4</sup> That workforce has played a key role in our state's growth and success in recent years. This same workforce will help us rebuild and thrive after the economic downturn.

Despite our strong record of postsecondary education and workforce training, Michigan will experience shortages of the middle-skill workers critical to economic recovery and long-term success. Prior to the recession, businesses across the state were reporting the negative impact of skilled worker shortages on their productivity and growth. To maintain our edge and ensure we

### HIGHLIGHT 1

#### What is a middle-skill job?

Some 46 percent of all job openings in Michigan between now and 2016 will be in middle-skill jobs.

#### What is a middle-skill job?

One that requires more than a high school diploma but less than a four-year college degree.

#### Who provides middle-skill training?

Community colleges, apprenticeship programs, nonprofit community-based training organizations, and private career schools.

#### How can we meet the demand for middle-skill and high-skill jobs?

Every working Michigander should have access to the equivalent of at least two years of education or training past high school and the basic skills needed to enter that training.

can take advantage of the job creation generated by the economic recovery, Michigan must invest in both high- and middle-skill education and training to ensure our businesses have the talent they need. At the same time we must also make investments to improve the basic skills of our low-skill workers.

Michigan has one of the country's strongest middle-skill guarantees in the country with its No Worker Left Behind initiative (NWLB), launched in 2007. NWLB pays tuition of up to \$5,000 per year for two years for 100,000 Michigan workers to pursue a degree or certificate at a community college, university, or other approved training program in a high-demand occupation (determined on a regional basis). The state reprogrammed \$40 million in federal funds—primarily from the Workforce Investment Act and Trade Adjustment Assistance programs—to support the initiative. After only two years, NWLB enrollment is about to surpass the Governor's original goal of reaching 100,000 workers in need of retraining. By simply expanding NWLB to cover all workers and ensuring that it is fully funded, we could guarantee that our citizens have the training to meet the demand for middle-skill jobs, now and into the future.

In addition, the Michigan Promise program guarantees every new high school graduate a \$4,000 scholarship for completing two years of postsecondary education at an eligible state institution. The Michigan Registered Apprenticeship Pilot Program provides employers with \$1,000 for each new apprenticeship they sponsor to help offset the cost of wages or training. \$1 million in ARRA funds have been set aside to pay for this program.

These are important pieces of a strategy to address the state's need for middle-skill workers, but more can be done.

Michigan needs a bold and broad vision to address the educational and economic challenges facing our state during these tough economic times and beyond. Those challenges demand **a truly transformative vision that allows every worker to be a part of economic recovery: guaranteed access to two years of postsecondary education or training.** Every Michigander must have the opportunity to earn the equivalent of at least two years of education or training past high school that leads to a vocational credential, industry certification, or one's first two years of college. It must be available at whatever point and pace makes sense for individual workers and industries. We must further ensure that every Michigander has access to the basic academic and workplace skills needed to pursue such education.

America has done this successfully before. There are precedents for resetting and raising the bar for educational attainment, and there is strong evidence that such broad human capital investments yield substantial dividends for both workers and businesses.

Our need for qualified middle-skill workers today is greater than ever before. Federal investments from the Recovery Act will create a boom in industries with predominantly middle-skill jobs, such as construction, transportation and green manufacturing. Matching the skills of our workforce with this demand will help our economy recover more quickly, take advantage of the resulting job creation, and prepare us for better times ahead.

Investing in Michigan's workers so that they can fill middle-skill jobs makes sense for Michigan, and for our nation as a whole.



## MICHIGAN'S FORGOTTEN MIDDLE-SKILL JOBS

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Conventional wisdom holds that our nation has evolved into an “hourglass” or “dumbbell” economy: a bifurcated labor market with a small number of highly skilled, highly paid workers and a much larger number of low-skill, low-paid workers.

Many people believe that high-skill jobs requiring a college education are the only key to economic competitiveness and success. Within such a model, middle-skill occupations— the jobs that fueled the expansion of the world’s largest economy in the 1950s and 60s and provided the foundation for a robust American middle class—are on the verge of extinction.

It’s a bleak picture, to be sure. It’s also a myth.

The truth is that **middle-skill jobs, which require more than a high school education but less than a four-year degree, currently make up the largest segment of jobs in the U.S. economy, and will continue to do so for years to come.**

While middle-skill jobs have declined slightly as a portion of total employment nationwide, roughly half of all employment today is still in middle-skill occupations. And nearly half (about 45 percent) of all job openings nationally between 2004 and 2014 will be at the middle-skill level. This compares with one-third of job openings in high-skill occupational categories and 22 percent in occupations requiring no more than a high school degree.<sup>5</sup>

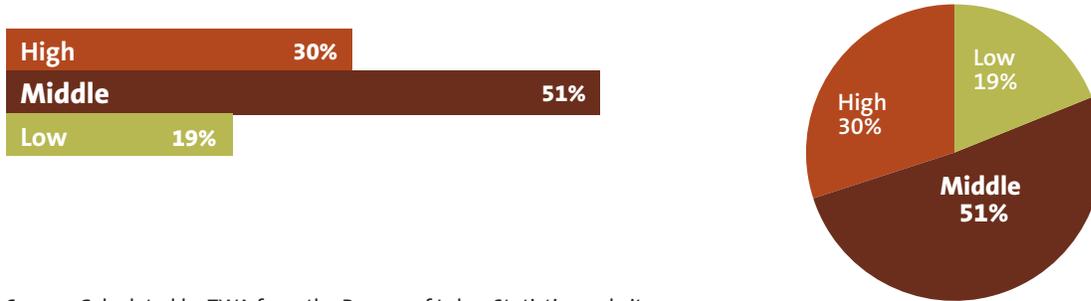
The national picture holds true in Michigan as well. Fifty-one percent of Michigan jobs in 2008 were middle-skill jobs, representing more than 2.1 million workers (Fig. 1, Table 1). The demand for middle-skill workers in the state will remain high in the decade between 2006 and 2016, constituting nearly 650,000 middle-skill job openings—46 percent of all job openings—expected during this time. This compares to low-skill jobs and high-skill jobs, which will account for 24 percent and 30 percent of openings respectively (Fig. 2, Table 2).

What’s more, *as federal economic recovery funds are invested, a large share of the jobs they create will be middle-skill jobs* building and repairing roads, manufacturing renewable energy products and caring for our aging population. Mark Zandi, Chief Economist at Moody’s, projects that by the fourth quarter of 2012, stimulus spending from ARRA will substantially improve employment nationwide in several industries dominated by middle-skill jobs, including construction (802,800 jobs), manufacturing (589,700) and transportation and warehousing (129,600).<sup>6</sup>

Despite these numbers, policymakers at both the federal and state levels have increasingly focused on college and university education, without proportionate attention to middle-skill jobs, and the education and training investments needed to ensure that workers have the skills they need to succeed in these vital occupations. This represents a lost opportunity to invest in our economy, both the immediate recovery and our long-term economic future.

*Demand for Middle-Skill Jobs is Strong, Will Remain Strong in Michigan*

**FIGURE 1. Michigan Jobs by Skill Level, 2008**



Source: Calculated by TWA from the Bureau of Labor Statistics website.

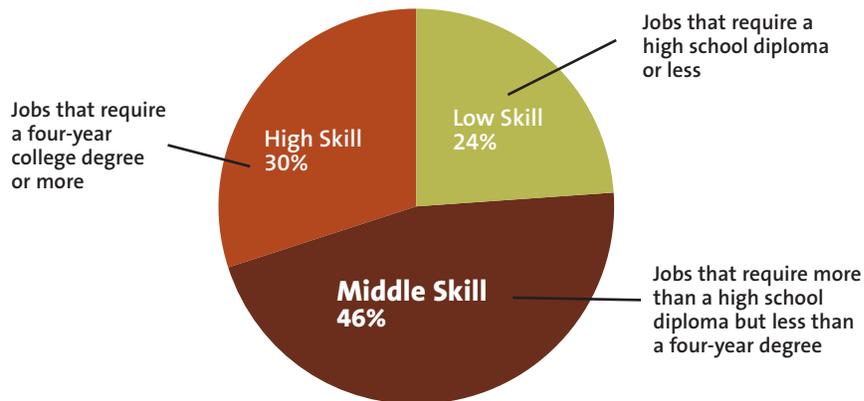
**TABLE 1. Michigan Jobs by Skill Level, 2008**

	Employment	Percent
<b>Total, All Occupations*</b>	<b>4,142,750</b>	<b>100.0%</b>
Management	170,230	4.1%
Business and Financial	187,800	4.5%
Professional and Related	870,800	21.0%
<b>Total, High Skill</b>	<b>1,228,830</b>	<b>29.7%</b>
Sales and Related	441,290	10.7%
Office and Administrative Support	651,190	15.7%
Construction	140,410	3.4%
Installation and Repair	162,240	3.9%
Production	432,300	10.4%
Transportation and Material Moving	284,410	6.9%
<b>Total, Middle Skill</b>	<b>2,111,840</b>	<b>51.0%</b>
Service Occupations	796,720	19.2%
Farming/Fishing/Forestry Occupations	5,350	0.1%
<b>Total, Low Skill</b>	<b>802,070</b>	<b>19.3%</b>

\*All Occupations also includes “non-classifiable” occupations which do not fit into standard occupational categories.

Source: Calculated by TWA from the Bureau of Labor Statistics website.

**FIGURE 2. Michigan’s Total Job Openings by Skill Level, 2006-2016**



Source: Calculated by TWA from Michigan Department of Energy, Labor and Economic Growth data.

**TABLE 2. Michigan Jobs and Total Job Openings by Skill Level, 2006-2016**

	Employment		Job Openings	
	2006	2016	Number	%
<b>Total, All Occupations</b>	4,721,991	5,036,512	1,413,980	100.0%
Management	271,871	280,222	63,320	4.5%
Business and Financial	213,574	235,320	57,890	4.1%
Professional and Related	965,581	1,073,656	301,500	21.3%
<b>Total, High Skill</b>	<b>1,451,026</b>	<b>1,589,198</b>	<b>422,710</b>	<b>29.9%</b>
Sales and Related	486,445	516,823	183,940	13.0%
Office and Administrative Support	699,656	723,590	192,820	13.6%
Construction	184,180	195,886	44,680	3.2%
Installation and Repair	185,880	196,903	40,690	2.9%
Production	464,333	449,902	98,800	7.0%
Transportation and Material Moving	310,921	319,697	85,650	6.1%
<b>Total, Middle Skill</b>	<b>2,331,415</b>	<b>2,402,801</b>	<b>646,580</b>	<b>45.7%</b>
Service Occupations	898,138	1,002,975	333,870	23.6%
Farming/Fishing/Forestry Occupations	41,412	41,538	10,820	0.8%
<b>Total, Low Skill</b>	<b>939,550</b>	<b>1,044,513</b>	<b>344,690</b>	<b>24.4%</b>

Source: Calculated by TWA from Michigan Department of Energy, Labor and Economic Growth data.

## HIGHLIGHT 2

### Missing the Roots in the STEM

Policymakers have become increasingly concerned about U.S. global competitiveness in recent years, and a broad consensus has developed about the need for a strong science, technology, engineering, and math (STEM) workforce to support innovation industries and emerging technologies. In particular, business and political leaders have called for increasing the number of students receiving bachelor or advanced degrees in these fields.

However, these highly skilled professionals aren't the only STEM workers in short supply. Employers have indicated there is a significant shortage of the technicians and middle-skill workers needed to implement the new technologies developed by highly skilled innovators.

A 2005 National Association of Manufacturers report found that while 35 percent of manufacturers anticipated a shortage of scientists and engineers, more than twice as many respondents anticipated a shortage of skilled production workers, precisely the kind of middle-skill jobs that require more than high school but less than a four-year degree.<sup>7</sup>

In a recent solicitation for grant proposals, the U.S. Department of Labor emphasized the importance of the middle-skill STEM workforce:

*"The STEM workforce pipeline challenge is not just about the supply and quality of the baccalaureate and advance degree earners. A large percentage of the workforce in industries and occupations that rely on STEM knowledge and skills are technicians, including others who enter and advance in their field through subbaccalaureate degrees and certificates or through workplace training. Creating interest and preparing more Americans to be productive in STEM-related jobs will require attention to segments of the workforce that are often overlooked in STEM discussions: incumbent workers who need skills upgrading, dislocated workers who are trying to find new jobs in industries with a future, and individuals from groups traditionally underrepresented in STEM fields."<sup>8</sup>*

Michigan is currently making changes to its high school curriculum designed to attract more students to STEM fields. While these changes are designed to prepare students for four-year colleges, they may be just as effective for preparing students for two year degrees and vocational programs in STEM fields. For example, the Michigan Merit Curriculum, adopted in 2006, requires every high school student to complete a rigorous set of courses, including four credits in mathematics and three in science. The requirements of the Merit Curriculum are as ambitious as they are important for the future of our state workforce and our economy. Students will leave high school ready to take on the post-secondary education needed in the growing number of middle-skill jobs in STEM.

A truly comprehensive innovation agenda must address the demand for both highly educated innovation professionals and the middle-skill workers needed to implement their innovations. These middle-skill workers are at the roots of a successful STEM strategy, nationally and in Michigan.



## THE FACE OF MICHIGAN'S MIDDLE-SKILL JOBS

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What is a middle-skill job? It requires education or training past high school, but not a four year degree. You may not know it, but you probably see people working in middle-skill jobs every day.

In fact, our communities and state rely on middle-skill jobs. **Middle-skill workers are the police officers and fire fighters who keep us safe. They are the medical technicians and therapists who keep us healthy. They are the air traffic controllers, electricians, and mechanics who keep our infrastructure up and running.**

They are local, hands-on jobs, meaning they are unlikely to be outsourced to other countries.

Many of these are well-paid jobs, offering Michigan workers a chance at economic security and prosperity. As illustrated in Table 3, these are jobs with good earning potential. Many offer median earnings that exceed the Michigan overall median for 2008 of \$33,730.

### HIGHLIGHT 3

#### Do all middle-skill jobs pay high wages?

Of course, not all middle-skill occupations pay well or have meaningful advancement opportunities. Skills are only part of the economic success equation. But nationally, growth in demand for many middle-skill occupations has been fast enough to generate not only strong employment growth, but also rapid growth in wages.

Regional research supports the connection between many middle-skill jobs and good wages. For example, demand for dental hygienists in the Detroit area is projected to grow by 25 percent by 2014 with an hourly wage of \$29.58.<sup>9</sup>

At the national level, the data tell a similar story. Between 1997 and 2005, American workers on the whole saw an overall real wage increase of just 5 percent (adjusting for inflation). At the same time, many middle-skill occupations saw significantly higher wage increases.<sup>10</sup>

## Thirty Middle-Skill Jobs Michigan Can't Live Without

**TABLE 3. Projected Michigan Demand for 30 Middle-Skill Occupations, 2006-2016**

	Employment		Net Change		Job Openings	Median Earnings 2008
	2006	2016	Number	%		
<b>Computers</b>						
Support Specialists	15,119	16,634	1,515	10.0%	6,190	\$42,310
Specialists, Other	11,031	11,713	682	6.2%	3,610	\$64,180
<b>Construction</b>						
Carpenters	31,711	33,714	2,003	6.3%	6,290	\$42,140
Electricians	23,995	25,068	1,073	4.5%	7,250	\$57,300
Painters	8,578	9,085	507	5.9%	2,030	\$39,580
Operating Engineers	9,092	9,681	589	6.5%	2,350	\$45,140
Plumbers	15,056	15,756	700	4.6%	3,810	\$58,030
<b>Healthcare</b>						
Dental Hygienists	8,602	10,382	1,780	20.7%	3,420	\$60,880
Diagnostic Medical Sonographers	1,814	2,080	266	14.7%	520	\$56,570
Licensed Practical Nurses	18,749	20,285	1,536	8.2%	6,650	\$40,910
Medical Lab Technicians	4,130	4,574	444	10.8%	1,060	\$32,480
Radiology Technicians	6,176	6,834	658	10.7%	1,500	\$48,750
Physical Therapist Assistants	2,464	3,174	710	28.8%	1,030	\$40,130
Respiratory Therapists	3,604	4,308	704	19.5%	1,230	\$50,530
Surgical Technologists	2,730	3,262	532	19.5%	1,360	\$39,360
<b>Installation, Maintenance, and Repair</b>						
Aircraft Mechanics	2,189	2,372	183	8.4%	400	\$54,290
Auto Mechanics	25,371	28,188	2,817	11.1%	7,910	\$37,940
Bus/Truck Mechanics	7,096	7,687	591	8.3%	2,130	\$42,270
Heating and AC Installers	8,232	8,894	662	8.0%	2,100	\$45,400
Industrial Machinery Mechanics	10,204	11,172	968	9.5%	2,670	\$47,910
Mobile Heavy Equipment Mechanics	3,458	3,667	209	6.0%	890	\$44,160
<b>Transportation</b>						
Air Traffic Controllers	372	419	47	12.6%	150	\$102,000
Heavy Truck Drivers	51,977	57,953	5,976	11.5%	15,200	\$37,160
<b>Public Safety</b>						
Emergency Medical Technicians	6,128	6,705	577	9.4%	1,280	\$29,790
Fire Fighters	6,733	7,165	432	6.4%	2,880	\$43,510
Police Officers	17,214	18,174	960	5.6%	5,560	\$51,690
<b>Other</b>						
Civil Engineering Technicians	2,457	2,639	182	7.4%	660	\$46,110
Claims Adjusters	8,222	8,865	643	7.8%	2,730	\$56,210
Legal Secretaries	6,684	7,248	564	8.4%	1,620	\$42,530
Paralegals	4,620	5,525	905	19.6%	1,520	\$47,800

\* 2008 median annual earnings for all occupations in Michigan = \$33,730

Source: Projections data tabulated using Michigan Department of Energy, Labor and Economic Growth data. Median Earnings data from the Bureau of Labor Statistics.

#### HIGHLIGHT 4

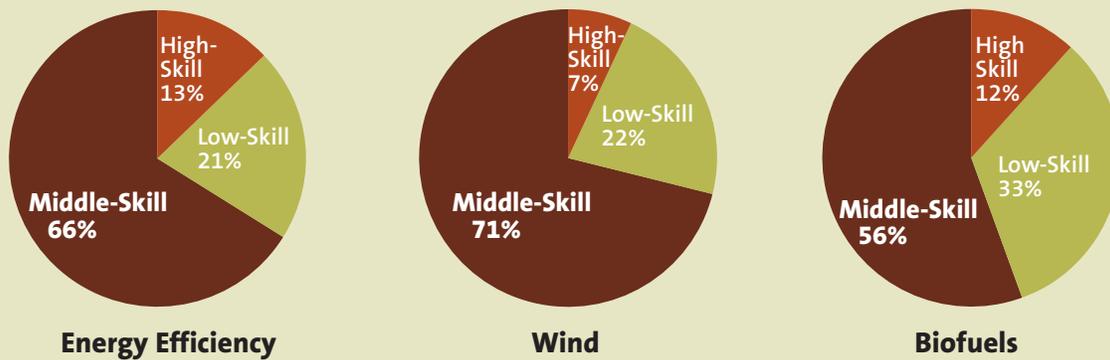
### The Middle of the Green Revolution

More than ever before, policymakers and business leaders are paying attention to clean energy industries and technologies, which promise profound environmental and economic benefits for all Americans. One of the highest priorities in federal and state economic recovery policies has been strong investment in creation of a “green economy” and “green jobs.” But what are those jobs?

A recent report by the Center on Wisconsin Strategy, the Apollo Alliance, and The Workforce Alliance found that the skills needed in the green economy closely mirror the middle-skill demands of the labor market as a whole. *Greener Pathways* examines emerging opportunities in the energy efficiency, wind, and biofuels sectors, and urges stakeholders to scale up green job training by leveraging existing state and local workforce development systems.<sup>11</sup>

#### *Green Jobs are Middle-Skill Jobs*

FIGURE 3. U.S. Employment in Green Industries by Skill Level, 2004



Source: Tabulated by TWA from the US Bureau of Labor Statistics website.

Findings from the 2009 Michigan Green Jobs Report mirror national data. The Michigan report found 109,067 “green jobs” in the state, nearly 89 percent of them working directly in the industry and the remaining 12 percent in supporting roles.<sup>12</sup> The same also found that “aside from Agriculture and Natural Resource Conservation, all green-related industry groups provide above-average industry wage rates.”



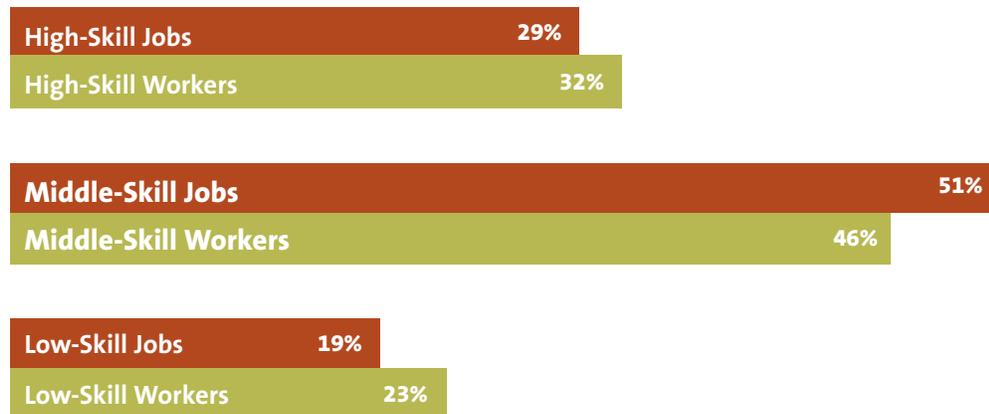
## MICHIGAN'S MIDDLE-SKILL GAP PAST AND FUTURE

Our state's economic recovery and long-term future depend in part on ensuring an adequate source of skilled workers to fill middle-skill jobs. Those middle-skill jobs are going to comprise the main portion of employment and worker-generated economic activity in our state.

Despite currently high unemployment and underemployment in our state, some industries with high numbers of middle-skill workers are still experiencing shortages of middle-skill workers (Fig. 4). In 2007, about 51 percent of all jobs were classified as middle-skill, but only 46 percent of Michigan workers had the education and training required to fill those positions. In reality, the gap was likely even greater in certain industries because many workers trained to the middle-skill level—and even those with bachelor's degrees—did not have the specific technical or soft skills needed. This means that thousands of well-paid and rewarding jobs were going unfilled in the state, in industries that are and will be essential to Michigan's economic portfolio.

### *Michigan's Skills Mismatch: A Middle-Skill Gap*

**FIGURE 4. Michigan's Jobs and Workers by Skill Level, 2007**



Sources: TWA analysis of data from Michigan Dept. of Labor, Energy and Economic Growth & US Bureau of the Census.

While Michigan, like the nation, is experiencing high levels of unemployment due to the current economic downturn and to long-term changes in the auto industry, as the state moves into recovery employers will once again face the challenge of finding qualified middle-skill workers. This could inhibit economic growth. What's more, as federal Recovery Act dollars flow to the states, a major portion of the resulting job growth will be at the middle-skill level, making middle-skill training a key piece of the recovery puzzle. Guaranteed access to two years of postsecondary education or training is a crucial investment right now to ensure our state's workforce will be prepared with relevant skills and ready to be part of the economic recovery.

Michigan's middle-skill challenge is exacerbated by problems at both the high and low ends of the skills spectrum. At the high end, education policies that focus exclusively on four-year college

degrees mean that as baby boomers retire and younger workers get older, the share of middle-skill workers available will fall. At the low end we have a growing number of residents who lack the reading, math and other basic skills needed to qualify for middle-skill training programs.

### **Greater Pain in High Demand Industries**

State and regional data underscore the challenges facing Michigan. As major employment in the state moves away from manufacturing and the auto industry, laid off workers must develop new skills to work in new sectors. While employers in industries that are faring better like health and education may find it easy to find people looking for work, they may have trouble finding potential workers with the right set of skills.

In the growing green sector, employers are already reporting difficulty meeting demand for workers with the specific skills they need. In Michigan, middle-skill jobs where employers are having trouble meeting demand include energy auditors, skilled trades (all), lead/hazardous materials workers, PV installers and truckers.<sup>13</sup>

### **Michigan Educational Projections: A Continuing Middle-Skill Challenge**

Michigan educational projections (Figs. 5, 6 and 7) suggest that the shortage of workers to fill middle-skill jobs that our state saw in 2007 is likely to worsen. During the fifteen years between 1990 and 2005, Michigan saw an increase in residents with educational attainment at the high-skill level and middle-skill level. Residents with low-skill education levels fell. **But our state will see a significant reversal in these trends over the subsequent fifteen years, when the share of middle-skill workers in Michigan's workforce is likely to decline at the same time that the percentage of low-skill workers is projected to increase.**

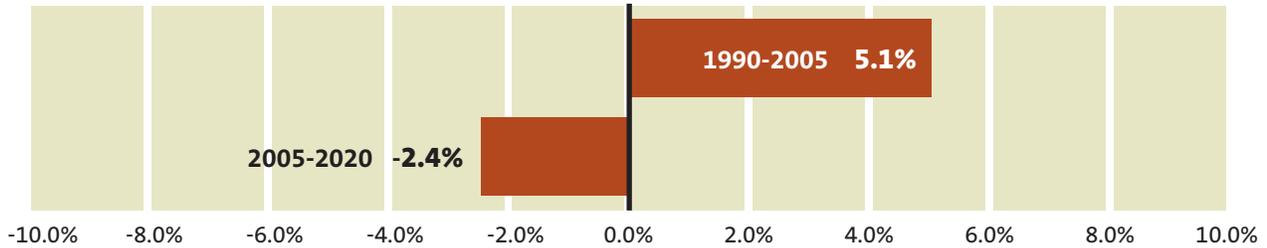
The number of high-skill workers will fall as well.

This trend is due in part to retirements and the aging workforce. Middle-skill, blue-collar workers are less likely to delay retirement than high-skill, white-collar workers. Immigration trends are likely to do little to offset this loss of middle-skill workers, as most workforce growth in the state due to in-migration will likely occur at the low-end of the skill spectrum or at the high-end of the skill spectrum (for example, engineers brought in from overseas through H-1B visas).

If not addressed, these educational trends will only make it harder for Michigan businesses to meet their needs from the state's available workforce, stifling economic recovery and growth, while limiting opportunity for thousands of Michigan workers to advance within the state's economy.

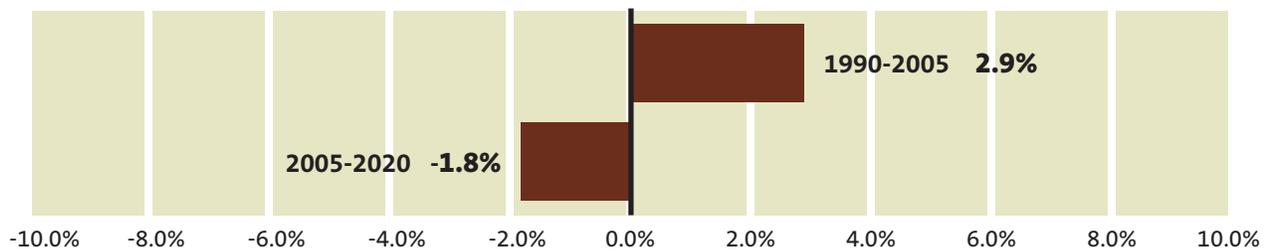
**Michigan's Future Middle-Skill Gap: Educational Attainment Past and Future**

**FIGURE 5. Percentage Change in High-Skill Michigan Workers, 1990-2020**



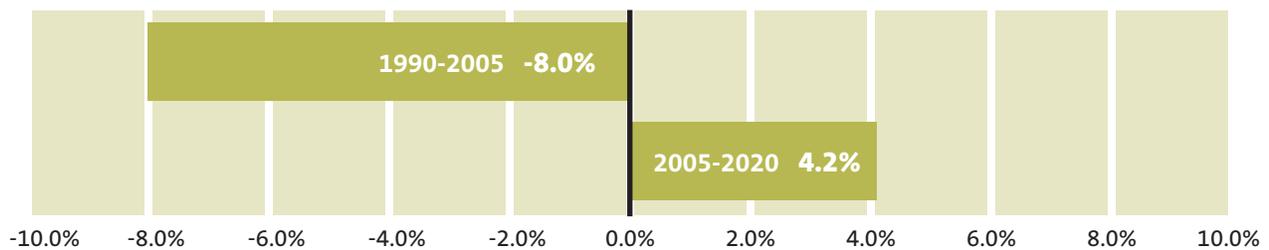
The number of workers prepared for high-skill jobs rose by more than five percent between 1990 and 2005. However, their ranks are expected to fall by 2.4 percent by the year 2020 (Fig 5, Table 4).

**FIGURE 6. Percentage Change in Middle-Skill Michigan Workers, 1990-2020**



While, the number of workers prepared for what is the largest share of jobs in the state—middle-skill jobs—grew by nearly three percent from 1990 to 2005. Their ranks are projected to fall by almost two percent by the year 2020 (Fig 6, Table 4).

**FIGURE 7. Percentage Change in Low-Skill Michigan Workers, 1990-2020**



After falling by eight percent since 1990, the number of workers educated at the low-skill level is expected to rise by more than four percent by the year 2020 (Fig 7, Table 4).

Sources, Figures 5-7: 1990-2005 attainment calculated by TWA using December 1990 and 2005 CPS data. Current attainment calculated by TWA using December 2005 CPS data. 2020 attainment projected by TWA using demographic data from the December 2005 CPS and population projections calculated by RAND California Statistics.

**TABLE 4. Actual and Projected Change in Michigan Workers' Educational Attainment, 1990—2020**

	1990	2005	2020	Change 1990-2005	Change 2005-2020
Low-Skill	30.2%	22.2%	26.4%	-8.0%	4.2%
Middle-Skill	45.0%	47.8%	46.1%	2.9%	-1.8%
High-Skill	24.9%	30.0%	27.6%	5.1%	-2.4%
Low-Skill	1,393,059	1,123,314	1,275,169	-269,745	151,855
Middle-Skill	2,077,854	2,422,457	2,228,050	344,603	-194,407
High-Skill	1,149,086	1,519,229	1,333,983	370,143	-185,246
<b>Total</b>	<b>4,619,999</b>	<b>5,065,000</b>	<b>4,837,202</b>	<b>445,001</b>	<b>-227,798</b>

Source: Current and past attainment calculated by TWA using December 1990 and 2005 CPS data. Current and past total labor force estimated by the Michigan Dept. of Labor, Energy & Economic Growth. 2020 attainment projected by TWA using demographic data from the December 2005 CPS and population projections calculated by RAND California Statistics.

### The Middle-Skill Gap and Michigan's Future Workforce

We cannot address this growing middle-skill challenge by focusing our education and training dollars solely on the next generation of workers who are coming out of high school. The fact is that **64 percent of the people who will be in Michigan's workforce in the year 2020 were already working adults in 2005—long past the traditional high school-to-college pipeline** (Fig. 8).

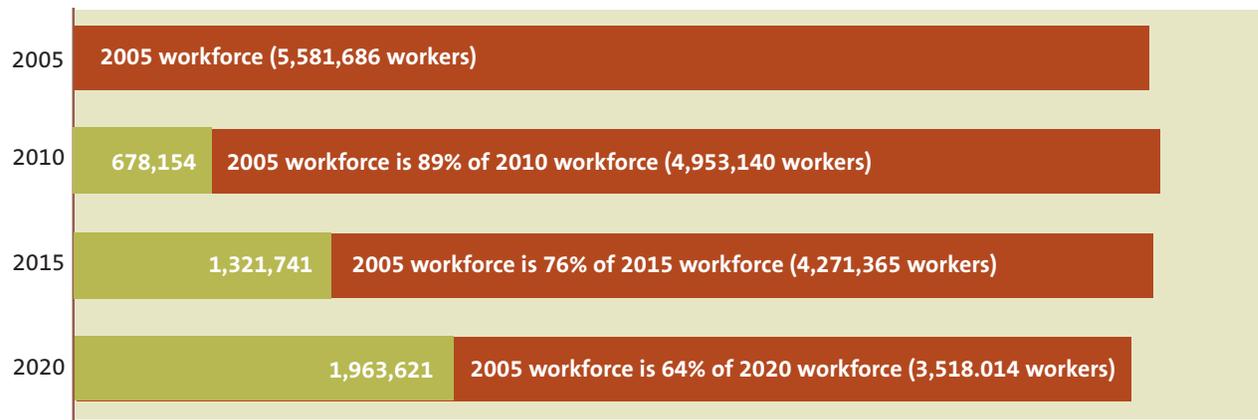
For that reason, to meet the demand for middle-skill workers we must target training, holistic skills development and education to people who are working or could be working today. But right now, the majority of public postsecondary education and training resources are devoted to a comparatively small number of young people under the age of 25. These are crucial investments, but they must be accompanied by significant investments in the adult workforce.

This disconnect between postsecondary education investments and employment opportunities must be addressed. Michigan should take proactive policy actions to build on the work it has done through initiatives like No Worker Left Behind to realign our workforce and education resources to better meet the state's labor market demand. This also must include maintaining, expanding and developing new training programs that will prepare many more Michigan residents who are now at the low-skill level for middle-skill jobs and careers.

## Michigan's Workforce of Tomorrow is in the Workforce Today

FIGURE 8.

### Working Michigan Adults Age 20-64 in the Current and Projected Population, 2005-2020



Source: Calculated by TWA using population projections from RAND California Statistics.

### An Even Greater Basic Skills Crisis?

Today, it is estimated that one out of three working-age Michigan adults — 1.7 million people — lacks the basic skills or credentials to attain a family-sustaining job and contribute to the state's economy.<sup>14</sup> Not only do we need investment in middle-skill training programs, but there is significant need for more broadly based basic skills education, both nationally<sup>15</sup> and in Michigan.

Despite the increases in U.S. educational attainment over the last twenty years, the National Assessment of Adult Literacy (NAAL) indicates only a slight increase in quantitative (math) skills between 1992 and 2003, and no improvement at all for prose and document literacy. Nationally, 93 million adults lack the literacy to participate in postsecondary education and training. This means that tens of millions of Americans cannot access middle-skill education and training programs because they lack basic English and math skills, or do not have a high school education.

Even for those who enter postsecondary education, basic skills can be a barrier to success. Nearly two-thirds of two year college students nationwide must take at least one remedial course.<sup>16</sup>

Like the nation as a whole, Michigan faces substantial challenges when it comes to basic skills. In 2003, eight percent of Michiganders lacked basic prose literacy skills.<sup>17</sup> Only five percent of Michigan adults with less than a high school diploma are enrolled in adult basic education, and only eleven percent of residents with limited English proficiency are enrolled in English as a Second Language (ESL) classes.<sup>18</sup>

**This evidence suggests that Michigan faces challenges in meeting the basic skill attainment levels needed to grow its middle-skill workforce.** With the right basic skills training, many more Michiganders could prepare to enter and succeed in middle-skill training and middle-skill jobs.

Recognizing these challenges and opportunities, Michigan has engaged in several programs to build basic skills in our workforce. The Michigan Department of Labor, Energy, and Economic Growth convened the Michigan Adult Learning Workgroup to look broadly at the need for basic skills improvement among adults in the state, and to re-imagine the adult learning infrastructure. This workgroup has mapped the state's existing adult learning programs and gathered employer perspectives in order to make policy and program recommendations about what should comprise Michigan's next generation adult learning strategy.

Michigan also is one of six states to join the Shifting Gears Initiative of The Joyce Foundation. As part of Shifting Gears, Michigan has assembled a team composed of officials representing workforce development, adult education and community colleges to coordinate programs so that they create pathways to college and career success for low-income working adults. At the local level, employers, advocates for low-income individuals and local workforce and education practitioners work to advance career pathways policies that both address the basic skills challenges and connect adults with training opportunities that lead to postsecondary credentials and career advancement. Perhaps most importantly, these organizations are able to identify issues which have consistently prevented adult workers from connecting with learning and progression pathways and work toward overcoming those barriers.

Breaking Through is a multiyear demonstration project that promotes and strengthens the efforts of innovative community colleges across the country to help low-literacy adults prepare for and succeed in occupational and technical degree programs. The goal is to strengthen postsecondary outcomes for low-income adults by focusing on strategies that create more effective pathways through pre-college and degree-level programs. Seven community colleges in Michigan are involved in this project, working to restructure their courses and approach to support the advancement of low-literacy students and address the needs of dislocated workers.



## CLOSING THE GAP

### The Face of Middle-Skill Education and Training

Who provides training and education for middle-skill jobs? The good news for Michiganders is that there are many different options.

While education for high-skill jobs is limited to college or post-graduate degrees, education for middle-skill jobs can come in many different forms (Table 5). The most commonly-known setting is community and technical colleges, but they are not the only place. Middle-skill education and job training programs include occupational certificates, associate’s degrees, and apprenticeship programs—and can be found in many different settings, including community and technical colleges, community based training organizations, and workplaces.

An associate’s degree allows students to enter the workforce immediately upon completion of the degree. Associate’s degrees are generally required for occupations such as licensed practical nurse, radiation therapist, and computer specialist. Vocational certificates guarantee certification of the knowledge and skills needed to perform the duties of a given occupation, according to regulations or nationally accredited standards. They generally require less classroom time than associate’s degrees, offering a path for individuals to develop and verify specific skills sets. They are also extremely useful for individuals already in the workplace as a means of reinforcing existing skills sets and acquiring new skills. Examples of jobs where a vocational certificate could be valuable include dental and legal assistants, auto mechanics and fire fighters.

Apprenticeships are supervised employment programs that combine classroom instruction and on-the-job training. Generally offered directly by employers or through labor/management partnerships, apprenticeships can be found in such high-demand careers as electrician, aircraft mechanic, or plumber.

### *There are Many Different Pathways to Middle-Skill Jobs*

**TABLE 5: Types of Training Programs for Middle-Skill Jobs**

	Associate’s degree	Vocational certificate	Apprenticeship
<b>Time to complete</b>	Two years, full time	Up to a year	Two to four years
<b>Availability</b>	Community college	Community college, community-based organization, technical school, workplace	Partnership between unions and employers
<b>Examples of types of jobs</b>	Radiation therapist, licensed practical nurse, computer specialist	Dental assistant, legal assistant, auto mechanic, firefighter	Electrician, aircraft mechanic, plumber

For workers whose basic skills are not at a level that allows them to enter these types of education and training programs, there are program options that teach English, basic reading and math skills in the context of occupational skills. These programs often connect to a specific job that is on a defined career ladder or else to further education that results in a middle-skill credential. While providing opportunity and resources to access these programs, we must work to ensure that the supply and development of our middle-skill workforce is directly and consistently relevant to employer demand.

In order to develop our state's middle-skill workforce to meet demands in the economic recovery and beyond, we must target significantly more resources –including input from employers of all sizes - toward a variety of middle-skill and basic skill training programs. We must create more flexible, demand-driven systems that allow working adults to return to training and education from time to time, to upgrade their skills and to earn additional certifications and degrees.

**Michigan has a number of exemplary middle-skill education and training opportunities that can serve diverse populations.** These are just a few examples:

- ◆ The Focus: Hope Information Technologies Center (ITC) provides a broad range of industry-certified, nationally-accredited training programs in personal computing technology, and in network and client/server administration. In close partnership with Wayne State University, the organization also offers a pathway for students to pursue a state-of-the-art bachelor degree program in Information Management and Systems Engineering.
- ◆ Macomb Community College, through its Workforce Development Institute, develops and runs training programs that are of special value to dislocated auto workers. Examples include its new Certified Nurse Assistant Program, which also provides wrap-around services to help remove obstacles to attending and completing the coursework, training programs for auto technicians in hybrid-electric technology and a new renewable energy certificate training program.
- ◆ The Jackson Area Manufacturers Association runs apprenticeship and pre-apprenticeship programs in a variety of advancing manufacturing fields such as industrial electrician, welding, tool and die making. Local manufacturers play an active role in designing the curriculum.
- ◆ Grand Rapids Community College, Training Solutions, has partnered with The SOURCE employer consortiums to develop demand-driven training for employers. They have also partnered with the Health Field Collaborative and other health care employers in developing high demand trainings for middle-skill jobs including pharmacy technicians, patient registration / unit tech positions and advanced certified nursing assistant. Employers play three key roles: Informing, developing and adjusting training curricula based on actual demand and developing opportunities for growth within their incumbent workforce as well as hiring trainees.

## A 21st-Century Skill Guarantee

If we are to realize our state’s full economic potential, educational access must reflect the demands of a 21st-century economy and the realities of the 21st-century workforce. Given that the largest portion of Michigan jobs are at the middle-skill level and the majority of future workers are already in the workforce today, the Skills2Compete-Michigan campaign supports the following vision for our state:

*Every Michigander should have access to the equivalent of at least two years of education or training past high school—leading to a vocational credential, industry certification, or one’s first two years of college—to be pursued at whatever point and pace makes sense for individual workers and industries. Every person must also have access to the basic skills needed to pursue such education.*

It’s an ambitious goal, but not an unprecedented one. Throughout our nation’s history, federal and state policymakers have elevated educational guarantees to meet the changing skill requirements brought on by economic and technological change. And, indeed, leaders in Michigan have already taken some steps to address similar challenges in the 21st century. But there is more to be done.

### **Historical Precedents**

As the nation transitioned from an agricultural economy to an industrial economy in the mid-nineteenth century, policymakers across the United States realized that a broader skill set was required from a much greater segment of the population. This was one important factor in the development of the high school movement to provide a free public education to all citizens. Between 1910 and 1930, the proportion of seventeen-year-olds in secondary education increased from less than 9 percent to 30 percent, fueling the expansion of America’s great cities and industries. By the late 1990s, nearly 70 percent of U.S. students were graduating with a high school diploma. Universal secondary education is now understood as one of the fundamental guarantees the U.S. makes to its citizens.

By the middle of the 20th century, society realized that postsecondary education and training would allow the United States to flourish. This was the atmosphere in which the GI Bill was passed in 1944. Between 1944 and 1956, nearly 8 million returning servicemen and servicewomen used the GI Bill. People pursuing four-year college degrees accounted for about a quarter (2.2 million) of those benefiting from the program. **But a much larger—and typically forgotten—6 million GIs pursued middle-skill training.** As such, a broad-based investment in middle skills was a major part of America’s post-war prosperity.

### **State Skill Guarantees**

Unfortunately, more recent federal investments in postsecondary education and job training have been in decline. The Recovery Act will make significant contributions to those education and training programs, but it constitutes a one-time, relatively short term investment. The overall long-term trend has been downward.

However, some forward-thinking states and policymakers—including Michigan leaders—have made vital commitments to the skills and economic security of their citizens, recognizing that a new minimum level of skills and education should be made available to state residents.

For example, the Georgia HOPE Grant program, funded with lottery proceeds, pays tuition, fees, and up to \$300 for books for Georgia residents to earn a certificate approved by the state

Department of Technical and Adult Education (or a comparable program of study approved by the Board of Regents) in a public technical college or public college or university. The HOPE Grant program does not have income- or merit-based criteria for eligibility (although recipients must make satisfactory academic progress while receiving it) and allows part-time attendance. According to the state Department of Technical and Adult Education, enrollment in public technical colleges has increased by 110 percent since the HOPE program began.

In Washington, the state legislature in 2007 authorized \$11.5 million per year for the Opportunity Grant program, which covers tuition for up to 45 academic credits at any state technical or community college, and up to \$1,000 per year for books and supplies. Any Washington resident student with a family income at or below 200 percent of the federal poverty level is eligible to participate in the program.

The Opportunity Grant model was constructed to help nontraditional students advance into high-demand, high-wage job opportunities. Opportunity Grants can be used toward completion of credentials, certificates, and apprenticeship programs in occupations where local and regional employer demand exceeds the supply of qualified applicants. Eligible programs must be linked to educational and career pathways, and colleges must demonstrate that there are jobs available for program graduates that pay at least \$13 per hour. In addition, schools must demonstrate that local businesses, labor groups, and other community stakeholders are active in supporting the creation or expansion of the program. For adults who cannot take advantage of the Opportunity Grant program because their basic skills are not at a sufficient level to immediately enter a postsecondary program, Washington State's nationally acclaimed IBEST initiative allows adults to learn basic skills while earning credentials for high-demand jobs with opportunities for educational and career advancement.

## **The Benefits and Returns of a 21st-Century Skill Guarantee**

The potential benefits and returns of a 21st-century skill guarantee are widespread. Guaranteeing up to two years of postsecondary education and training will benefit the individuals who get that training, strengthen the productivity of the state economy, and could increase public resources.

Simply put, more education means greater participation in the workforce and higher lifetime earnings. A recent examination of Michigan's adult learners found that 82 percent of adults with an associate's degree and 79 percent of adults with some college (but not a degree) participated in the workforce, compared to only 72 percent of adults with a high school education and 55 percent of adults with less than a high school education.<sup>19</sup> **In addition to higher work participation rates, adults with some college averaged about \$274,000 more in lifetime earnings than those with only a high school education, and adults with an associate's degree averaged about \$461,000 more in lifetime earnings.**<sup>20</sup>

These findings are consistent with national findings that the median worker with an associate's degree earns about 33 percent more than a worker with only a high school degree, while workers with a bachelor's degree earn about 62 percent more than workers with only a high school degree.<sup>21</sup> These national findings indicate not just that postsecondary education provides a significant earnings advantage for workers, but also that on a *per-year basis*, benefits for workers receiving a two-year degree are comparable to those receiving a four-year degree.

For many years, Michigan jobs that required only minimal training and education paid better than the national average for jobs with the same educational requirements. This includes manufacturing jobs in the auto industry, once the backbone of our economy. However, jobs that required higher levels of training in Michigan paid less than the national average. As auto manufacturing jobs continue to decline, Michigan may expect to see a continued decline in

statewide average wages. We can reverse this trend, though, if we invest in preparing workers for higher-paying middle-skill jobs.

More education also is associated with lower unemployment. Nationally, in July 2009 unemployment for workers with less than a high school diploma was nearly 15.4 percent. For those with a high school diploma it was 9.4 percent, while for those who'd completed high school plus some college—our middle-skill level—the unemployment rate was 7.9 percent.<sup>22</sup>

A guarantee of access to at least two years of postsecondary education for all workers would increase productivity and earnings in Michigan. According to the Organization for Economic Cooperation and Development (OECD), each year of postsecondary education leads to an increased per capita output of between 4 and 7 percent.<sup>23</sup> Increasing the average total schooling of a city's population by two years increases the wages of all workers by about 6 percent, regardless of individual educational attainment.<sup>24</sup> And one additional year of schooling leads to an 8.5 percent increase in productivity in the manufacturing sector, and more than a 12 percent productivity increase in other industrial sectors.<sup>25</sup>

A 21st-century skill guarantee for all Michigan workers also would increase public resources. Increasing the number of U.S. adults with middle-skill credentials by 10 percent would increase federal tax revenue by \$14 billion,<sup>26</sup> and would save the federal government up to \$2,500 per person in reduced reliance on public assistance programs.<sup>27</sup>



## CONCLUSION

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Middle-skill workers are at the heart of our nation's economic recovery, and they will serve as the backbone of our state economy for years to come. They will repair our roads and bridges, care for our sick and elderly, transport our goods, keep our communities safe, and provide a host of other services we rely on daily.

In the short term, our workforce must be ready to meet demand as Recovery Act funds begin creating middle-skill jobs. In the long run, we must provide training and education needed to meet demand for the greatest portion of jobs in our economy.

Right now, our state's funding for training and education is built on the myth of the hourglass economy. We do not invest enough in training people for middle-skill jobs.

Without those investments, we cannot provide adequate resources to allow working adults to seek greater training and education to improve skills and advance in their careers. Without those education and training opportunities, our businesses and communities will suffer from a lack of qualified workers. Our economic recovery will be slowed.

As Michigan receives Recovery Act funding, we have a unique opportunity to take a closer look at our economy and the importance of middle-skill jobs in it. What will we do to ensure our education and training policies reflect the reality of the job market?

While Michigan has taken some important steps to address the growing shortage of middle-skill workers, **it is time for a bold, visionary step that will ensure all Michigan workers can be a part of economic recovery and secure our place in a 21st-century economy.** At various times in our nation's history, visionary leaders have adjusted the basic level of education guaranteed to all Americans as a way to adjust to a changing economy and remain competitive. Universal high school and the GI Bill are examples of when we did this with great success in the past.

It's time to do it again by guaranteeing that all Michigan residents have access to at least two years of postsecondary education or training. This should be the guiding vision for Michigan's economic and education policy. It would provide our workers and businesses with the skills they need not only to rebuild and recover, but to compete in an increasingly competitive global marketplace.

How will we do this? Leaders from the business, labor, and training communities are ready to roll up their sleeves and make it happen, if they are supported by strong political leadership and commitment. It is time for Michigan policymakers, educators, unions and businesses to unite with others around the country around this new vision, to champion the policies and strategies necessary to ensure that Michigan recovers and thrives, and that our workforce is at the forefront of the innovation economy.

## APPENDIX: METHODOLOGY

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**Table 1 and Figure 1:** Data from the Bureau of Labor Statistics.<sup>28</sup> Occupational categories (high, middle, low skill) based on the methodology used in Holzer and Lerman, 2007.<sup>29</sup>

Classifying occupations into a few skill categories is awkward, given the many elements of skill required for most jobs. Under an approach that classifies jobs based on education and training levels, “middle-skill” jobs are those that generally require some education and training beyond high school but less than a bachelor’s degree. These postsecondary education or training requirements can include associate’s degrees, vocational certificates, significant on-the-job training, previous work experience, or some college, but less than a bachelor’s degree. We divide the broad occupational groups into high-skill, middle-skill, and low-skill categories based on BLS estimates of the educational attainment and training of people in those jobs. Using this information, we define:

- ◆ High-skill occupations as those in the professional/technical and managerial categories.
- ◆ Low-skill occupations as those in the service and agricultural categories.
- ◆ Middle-skill occupations as all the others, including clerical, sales, construction, installation/repair, production, and transportation/material moving.

This definition is clearly imperfect, since there are many professional/technical and service jobs that are clearly middle-skill while there are jobs in the clerical, sales and other categories that are not. However, on average, these discrepancies tend to cancel out, and trends in these categories roughly capture the ones we want to measure.

These skill categories reflect only average skill demands within broad occupational categories. Some occupations within the technical and managerial categories actually require less than a bachelor’s degree, while some in the middle categories might require only high school, and some in the service category may require more than high school. Therefore, whenever possible, we supplement our analysis of broad categories with those of detailed occupations.

**Table 2 and Figure 2:** Based on occupational projections for 2006-2016 by the Michigan Department of Energy, Labor and Economic Growth.<sup>30</sup> Occupational categories (high, middle, low skill) based on the methodology used in Holzer and Lerman, 2007.

**Figure 3:** Data from BLS.<sup>31</sup> Occupations divided into skill levels (high, middle, low) based on educational attainment requirements as defined by BLS. Because BLS does not classify occupations as green jobs or not, this section of the report assumes that the skills distribution in green jobs is the same as the skills distribution that occurs across all related occupations.

**Table 3:** Based on occupational projections for 2006-16 by the Michigan Department of Energy, Labor and Economic Growth, using recategorization of occupations according to BLS Education and Training Categories.<sup>32</sup> Jobs requiring at least moderate-term on-the-job training, related work experience, a post-secondary vocational award, or an associate’s degree were classified as middle-skill.

**Figure 4:** Based on occupational estimates for 2007 by the Michigan Dept. of Labor, Energy & Economic Growth, and December 2007 Current Population Survey (CPS) data on educational attainment by state.<sup>33</sup> Occupational categories (high, middle, low skill) based on the methodology used in Holzer and Lerman, 2007. Only workers in the labor market and at least 25 years of age (ie., past traditional school age) are counted.

**Figures 5, 6 and 7, and Table 4:** Based on Current Population Survey (CPS) data for December 1990, and 2005<sup>34</sup> along with population projection data by RAND California Statistics<sup>35</sup> and labor force estimates by the Michigan Department of Energy, Labor and Economic Growth.<sup>36</sup>

**1989, 2005 and 2020 Educational Attainment:** Past years' educational attainment data reported only for workers in labor force and aged 25 and over, using CPS data. 2020 projections calculated using static educational attainment model presented in Hanak and Baldassarre, 2005.<sup>37</sup> In that model, educational attainment figures are calculated for the state's current workers (workers aged 25-49 in 2005) for each of 12 different race, ethnicity, gender and age cohorts. Educational attainment for these cohorts is assumed to be static over the ensuing 15 years (2020), and educational attainment for new cohorts of workers (i.e., younger than 25 years in 2005) is assumed to mirror that of similar age-race-gender groups today. As such, changing educational attainment throughout the state's population is calculated based on projected demographic changes in the composition of the working population, and does not take into account possible changes in behavior, immigration, et.al.

**Creating Skill Categories Using Educational Attainment Data:** Skill attainment categories (high, middle, low) for 1990 created using a reclassification of CPS-reported "grades completed" that parallels the educational attainment categories later used by CPS, and reclassified in this table for current and future years using the same method as in Figure 4, p. 15.

**Figure 8:** Data from long-term population projections (2000 to 2030) by age cohorts, as calculated by RAND California Statistics.<sup>38</sup> Each cohort was either classified as a "current working age adult" or "not a current working age adult" based solely on age. Current working age was defined as ages 20 to 64.

## ENDNOTES

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