



**Business Growth and  
Family Sustaining Job  
Opportunities in a  
Changing, More Sustainable  
Economy Working Group**

**FINAL REPORT AND RECOMMENDATIONS**

MAY 2023

## **Business Growth and Family Sustaining Job Opportunities in a Changing, More Sustainable Economy Working Group**

### **Final Report and Recommendations**

*May 2022*

#### **Working Group Charge:**

The Minnesota Business Vitality Council (MBVC) charged the Business Growth and Family Sustaining Job Opportunities in a Changing, More Sustainable Economy working group to identify strategic areas of focus and near-term opportunities to support both business growth and jobs related to a more sustainable economy through exploring answers to the following:

- What are potential clean, resilient, and sustainable emerging markets, including products and services? What are the related workforce opportunities and needs?
- What workforce needs do businesses have that contribute to sustainability? Is there an available workforce to meet those needs or is there a projected workforce shortage?
- Which jobs require significant upskilling or training? Is there training infrastructure to meet this need? Where are there gaps?
- Who currently has access to these jobs and what might be done to expand access to increase economic benefits to the most Minnesotans or to those historically kept out of our labor force?

#### **Working Group Members**

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Minnesota Office of Higher Education (OHE)  
Minnesota Department of Transportation (MnDOT)  
Minnesota Department of Agriculture (MDA)  
Minnesota Department of Natural Resources (DNR)  
Minnesota Department of Commerce (DOC)  
Minnesota Office of Higher Education (OHE)  
Minnesota Pollution Control Agency (MPCA)  
Minnesota Management and Budget (MMB)  
Minnesota Department of Veterans Affairs (MDVA)



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## EXECUTIVE SUMMARY

Formed in 2020, the MBVC is a government interagency group designed to tackle complex economic development issues, discover cross agency solutions, and capitalize on opportunities to grow the state’s economy. The MBVC is centered on work groups where teams from relevant agencies come together for project sprints to focus on burgeoning business opportunities critical to Minnesota’s economic growth.

In early 2022, the MBVC charged the *Business Growth and Family Sustaining Job Opportunities in a Changing, More Sustainable Economy Working Group* to identify strategic areas of focus and near-term opportunities to support both business growth and jobs related to a more sustainable economy and that lead to a family sustaining income. Throughout 2022, the working group met bimonthly developing sector reports, consulting industry subject matter experts, and conducting research and outreach efforts to develop the following analysis of the opportunity and challenges related to a clean, resilient, and low-carbon economy and related jobs.

The working group identified three key recommendations which represent a throughline across the identified sector opportunities. Specific sector opportunities were also identified across six industries.

### Key Recommendations:

**Grow New Industries and Businesses:** Growing demand for net-zero offerings are predicted to generate more than \$12 trillion of annual sales by 2030. As new technologies emerge, policies change, and consumer demand shifts, homegrown Minnesotan jobs and businesses will witness increasing opportunities to benefit from a clean, resilient, and low-carbon economy.

**Leverage and Augment Educational and Workforce Training Infrastructure:** A strategy that leverages existing workforce training and education infrastructure through programs across multiple agencies and systems will support Minnesota’s industry advancements in existing professional, technical, and blue-collar occupations, as well as prepare and train new industry workers for the growing clean economy.

**Support Inclusion Strategies and Address Barriers to Work in a Changing Economy:** Women and Black, Indigenous, and people of color (BIPOC) are significantly underrepresented in clean jobs and generally employed in lower-paying roles compared to colleagues. By ensuring organizational silos are broken down, adapting current systems, and incorporating inclusive human-centered approaches, Minnesota can proactively mitigate job growth from disproportionately benefiting white and male employees.



## Sector Opportunities

### ENERGY:

At a time when many energy businesses are already reporting difficulty hiring, the Inflation Reduction Act (IRA) will spark even more demand for energy jobs. With women and BIPOC significantly underrepresented, Minnesota has an opportunity to increase access to these jobs for those traditionally underrepresented in these occupations.

#### Next Steps

- Assess Supply of Contractors/Workers Linked to Education and Training Opportunities
- Enhance Inclusion Strategies
- Boost Efforts and Capacity to Upskill Workers
- Boost Future Workforce by Engaging Students and Current Workers
- Reduce Barriers by Enhancing Programs and Supports that Enable Apprenticeship Readiness



### FORESTRY:

The forest industry is a foundational part of Minnesota's economy. Sustainable management practices have and will continue to be key to success in the industry. As harvest seasons trend shorter due to overall warming, the industry must increase productivity by adopting new and evolving technology and skills. This will require ongoing and increasing need for skilled workers across associated occupations.

#### Next Steps

- Keep the Public Conversation Going
- Implement a Forestry Jobs Promotion Working Group
- Work with Minnesota Job Skills Partnership Board to Fund a Forestry Jobs Working Group
- Make Increased Workforce Diversity an Essential Component of the Forest Industry Conversation
- Support Funding for Evolving Curriculum at CFANS and Minnesota State
- Analyze and Consider Improvements to the CDL Licensing Procedure

### MANUFACTURING:

The IRA, which includes several transformative tax incentives for solar energy products and manufacturing, is expected to create new factories, jobs, and opportunities for the industry, which already represents the single largest private sector component of Minnesota's GDP. These business and inclusive employment growth opportunities could position Minnesota to be a strategic industry leader.

#### Next Steps

- Promote Opportunities within the IRA to Manufacturers
- Attract and Grow Electric Vehicle Supply-Chain Businesses
- Strengthen Technology and Robotics in the K-12 System
- Offer and Support the Minnesota Tour of Manufacturing
- Address Common Workforce Barriers: Childcare and Driver's Licenses
- Educate Manufacturers on how to Connect with and Retain more Diverse Workers

## **SUSTAINABLE AVIATION FUELS:**

Sustainable Aviation Fuels (SAF) are crucial to the aviation industry's efforts to decarbonize. With total U.S. SAF production only 4.5 million gallons, and global jet fuel demand estimated to be 230 billion gallons in 2050, exponential growth in SAF production is needed to meet the industry's greenhouse gas (GHG) reduction commitments and goals. Already a leader in ethanol and biodiesel production, Minnesota is well positioned to capitalize on this emerging and growing SAF industry.

### **Next Steps**

- Catalogue Existing State Infrastructure, Assess Feedstock and Producer Potential, and Identify Gaps
- Expand State Policy and Business Support
- Support a Sustainable Aviation Fuels Taskforce
- Promote Minnesota's Existing Sustainable Aviation Fuels Competitive Advantages

## **TRANSPORTATION:**

The Metro Transit's Zero Emission Bus Transition Plan is aiming for at least 20 percent of its 40-foot replacement bus purchases to be electric within the next five years. MnDOT applied for grants funds made available through the Federal Bipartisan Infrastructure Law to use towards electric busses. Leading on lower carbon transportation products and services can give Minnesota a competitive advantage at a time when the state is experiencing significant workforce shortages and declines.

### **Next Steps**

- Explore Opportunities in Partnership with Electric Bus Manufacturers
- Train the Future and Existing Workforce in the Industry's Evolving Skillsets and Benefits
- Increase Awareness of Transportation Careers
- Reduce Common Workforce Barriers: Red Tape, Mentorships, Workplace Practices

## **WASTE AND WASTEWATER:**

Minnesota is experiencing a decrease in wastewater operators choosing or continuing in the field. In 2019, the Council on Water Supply Systems and Wastewater Treatment Facilities, which provided direction and feedback on job training and certification, came to a sunset, making adapting training for the evolving industry more difficult. Reshaping the sector from traditional to more clean methods of disposal will create and sustain concomitant clean and resilient jobs in the state.

### **Next Steps**

- Prioritize Workforce Growth to Meet Expanding Recycling, Composting, Reuse and Repair Infrastructure
- Address Identified Wastewater Workforce Training Barriers: Professional Licensure Pathways, Conditional Certifications, and Advisory Council
- Build more Local and Sustainable End Use Markets for Recycling and Food Waste Digest
- Support Existing and New Waste Prevention, Reuse, Recycling, and Composting Initiatives
- Support Education About Organic Waste and Composting
- Pass Right to Repair Legislation in Minnesota
- Require Building Material Management Plans and Develop Deconstruction Ordinances

## INTRODUCTION

Across Minnesota, employers from manufacturers to construction firms are orienting their practices, services, and products towards sustainability. As new technologies emerge, policies change, and consumer demand shifts, the potential for homegrown jobs and businesses benefiting from a clean, resilient, and low-carbon economy is considerable: A recent McKinsey analysis found growing demand for net-zero offerings, the practice of cutting GHG emissions to as close to zero as possible, could generate more than \$12 trillion of annual sales by 2030.<sup>1</sup>

Industry knowledge and skills related to cleaner and more sustainable production are one component of a much broader occupational skill set. For example: autoworkers who manufacture electric vehicles are still autoworkers; electricians who install and connect solar farms are still electricians; carpenters who build more energy-efficient buildings to meet new energy standards are still carpenters. Accordingly, a state strategy to prepare and train workers for the growing clean economy – while also supporting industry advancements in these areas – should leverage the state’s existing workforce training and education infrastructure, through programs across multiple agencies and systems, to prepare and train clean economy workers across industries.

### Available and Projected Jobs

Analysis of available jobs data and consultations with industry stakeholders demonstrate that the majority of jobs contributing to a more sustainable economy are existing professional, technical, and blue-collar occupations. The predominance of blue-collar work is evident in both *Table 1* and *Figure 1*, particularly in the energy and transportation sectors.

*Table 1* outlines a snapshot of occupations representing the energy, forestry,<sup>2</sup> manufacturing, transportation, and the waste and wastewater sectors that have a projected growth in jobs, a high number of jobs relative to the sector, and family-sustaining wages.

**TABLE 1: OCCUPATIONS OF FOCUS<sup>3</sup>**

Occupation	Number of jobs	2020-2029 growth rate	2020 job openings	2019 median wage	Demographics	Education required	Training and credentials
Electrician-residential retrofitting	7,669	8.1% in MN	276	\$31.81	96.6% male, 95.7% white	High school diploma or GED or higher	Apprenticeship, license
Heating, air conditioning, refrigeration mechanics and installers – residential retrofitting	2,899	5% nationally*	334	\$30.49	98.1% male, 95.4% white	High school diploma or GED or higher	
Refuse and recyclable material collectors – waste	2,016	11.9% nationally*	66	\$23.53	81.6% male, 69.5% white		
Heavy and tractor-trailer truck drivers – waste	1,160	6.3% nationally*	2,420	\$25.18	No data available	High school or less	
Construction laborers (waste)	480	7.1% in MN	1,394	\$23.16	96.7% male, 88.7% white	High school or less	Apprenticeship

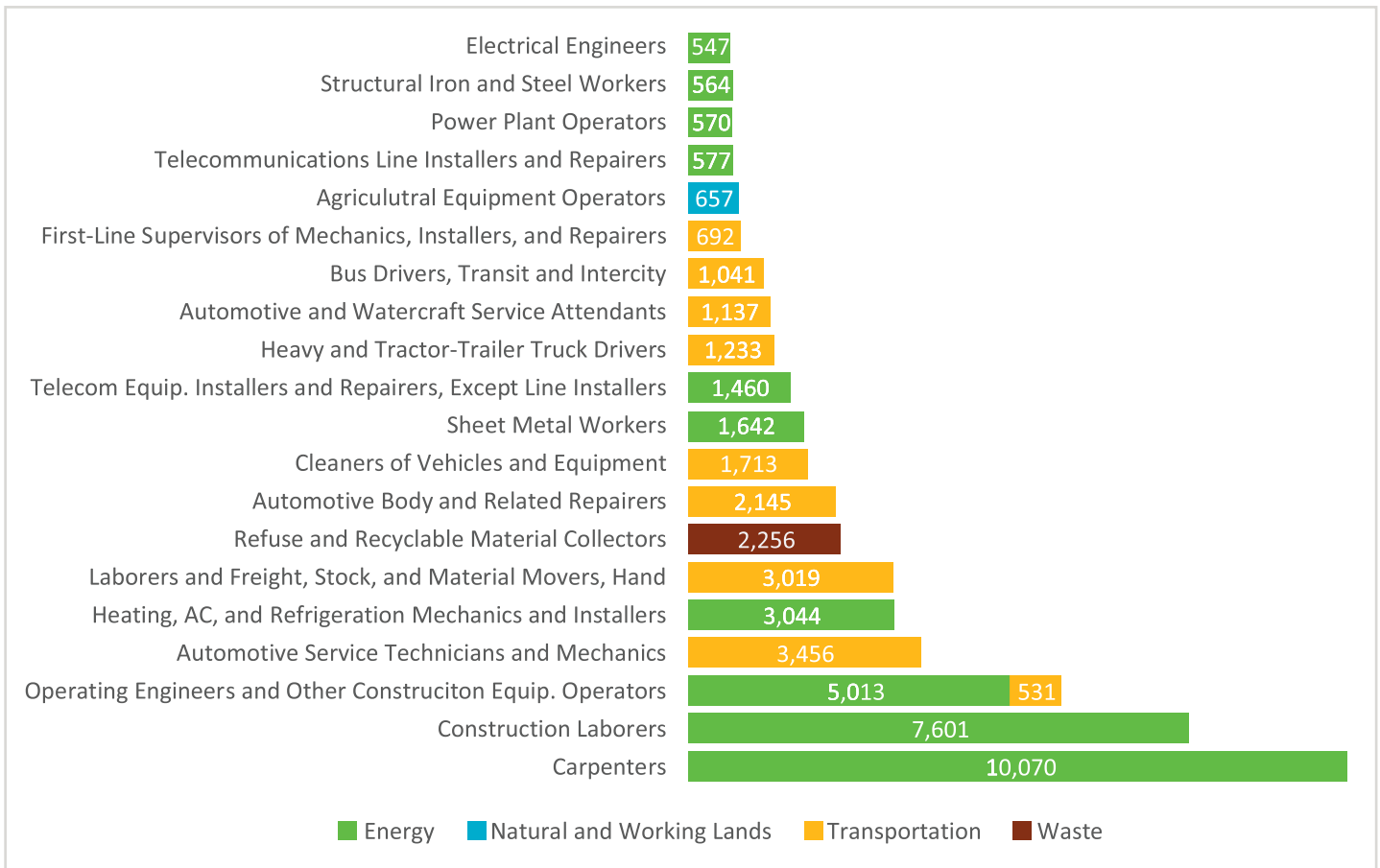
\*No Minnesota job growth rate available

<sup>1</sup> Bland, Rob, Anna Granskog, and Tomas Naulé. “Accelerating Toward Net Zero: The Green Business Building Opportunity.” *McKinsey Sustainability*. <https://www.mckinsey.com/capabilities/sustainability/our-insights/accelerating-toward-net-zero-the-green-business-building-opportunity>.

<sup>2</sup> Forestry jobs data is less available; occupations included are those identified through stakeholder outreach

<sup>3</sup> Data compiled by DEED from the U.S. Bureau of Labor Statistics 2021 Occupational Employment and Wage Statistics, Minnesota 2020 Employment Projections, Minnesota 2006–2010 Affirmative Action Statistics, Minnesota 2020 Job Vacancy Survey, U.S. Department of Labor Standard Occupational Classifications (SOC) data, and North American Industrial Classification System (NAICS) data.

**FIGURE 1: 2030 STATEWIDE NUMBERS OF JOBS FOR MINNESOTA OCCUPATIONS PROJECTING 500+ POSITIONS<sup>4</sup>**



## Disparities in Existing Workforce

There are significant gender and racial disparities in who has access to in-demand clean and sustainable jobs. Based on labor market information available and classified using U.S. Department of Labor’s Standard Occupational Classification (SOC) typology,<sup>5</sup> not only are women and Black, Indigenous, and people of color (BIPOC) employees significantly underrepresented in clean and sustainable jobs, but they are generally employed in lower-paying occupations compared to those most dominated by men and white employees. As shown in *Figure 2*, women and BIPOC employees in clean and sustainable jobs earn an average of \$4–\$5 less per hour than men and white employees, equivalent to a loss of \$8,000–\$10,000 annually for full-time work. Almost half of women (47 percent) and a quarter of BIPOC employees (24 percent) in clean and sustainable jobs are in occupations earning below the state median hourly wage, which is \$22.88 per hour, compared to one in twelve men (8 percent) and one in eight white employees (12 percent).<sup>6</sup> Further analysis suggests that, unless swift action is taken to reduce gender and racial disparities, projected job growth will continue to

<sup>4</sup> “Occupations in Demand Data Tool.” *Minnesota Department of Employment and Economic Development*, <https://mn.gov/deed/data/data-tools/oid/>. Accessed Aug. 2022.

<sup>5</sup> Data compiled by DEED

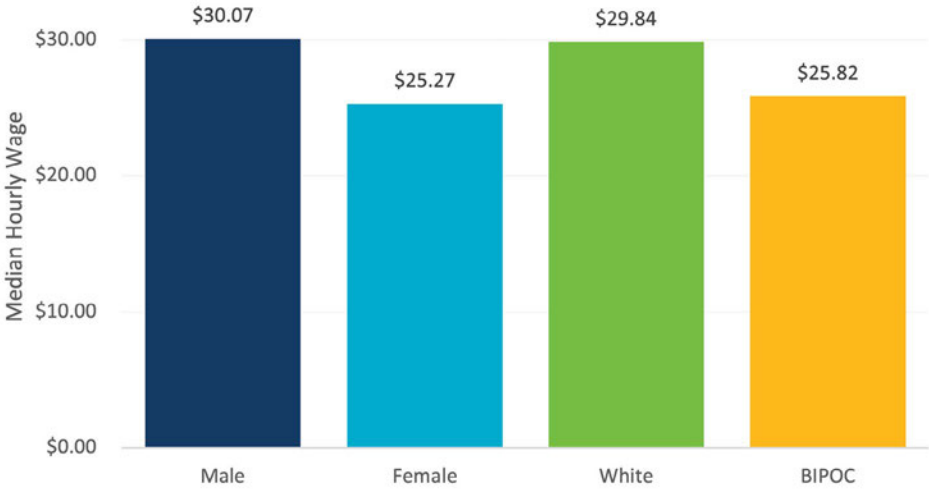
<sup>6</sup> *ibid*





disproportionately benefit white and male employees. See [Appendix B](#) for the stratification of clean and sustainable occupations by median wage and employee gender, race, and ethnicity demographics.

**FIGURE 2: MINNESOTA CLEAN AND SUSTAINABLE JOBS: CURRENT MEDIAN WAGE BY EMPLOYEE DEMOGRAPHICS<sup>7</sup>**



<sup>7</sup> *ibid*

## Foundational Education, Inclusive Strategies Key to Connecting Workers to Jobs

The changing economy impacts workers along a spectrum of education and training needs. Efforts to make the most immediate impact to meet workforce gaps should prioritize training or reskilling of existing workers. There are a wide variety of existing educational and training entities from which most workers receive some training prior to entering the workforce. These programs must continuously update their curriculum and certifications to incorporate new technology-related knowledge. Additionally, programs need to evaluate pathways into their respective programs to eliminate barriers for those underrepresented in clean and sustainable jobs.

See [Appendix A](#) for an overview of how Minnesota trains, supports, and otherwise prepares thousands of individuals for the workforce each year.



### Incumbent Worker Upskilling

Changes in technologies and processes mean students or job seekers will need training tailored to these new skills while incumbent workers will need access to upskilling to remain competitive in the workforce. “Incumbent worker programs” allow individuals to access workforce system-supported training and services, while working, to help them learn new skills and obtain certifications that can help them advance along a career pathway.



### Inclusive Strategies

Inclusive strategies must be deployed to support historically disadvantaged workers experiencing barriers to education, training, and sustainable employment. These strategies should include increased outreach and engagement with diverse communities to target services to the populations most in need and helping employers connect to communities they may not have historically recruited or hired from. Barriers along touchpoints within the system will have to be identified and addressed to connect a broader representation of workers to jobs.

## KEY RECOMMENDATIONS

The emergence of new technologies, policy changes, and shifts in consumer demand represent an opportunity for the state to benefit from a clean, resilient, and low-carbon economy through strategic growth and development of homegrown jobs and businesses. It is imperative that our current systems do more to adapt and innovate, use a human-centered approach to service and training delivery, and break down organizational silos to better serve students, job seekers, and employers.

Businesses are in the best position to:

- identify specific skill and training needs;
- validate or provide value for different certifications;
- are an irreplaceable partner when it comes to hiring, retaining, and supporting workers through incumbent worker and customized training;
- are hiring individuals who have completed workforce programs; and,
- are partnering with our public workforce and education systems.

While climate-related goals or regulations may drive some priorities or strategies in this space, it is the demands of industry and our systems' ability to respond to these demands that will largely determine the impact and success of workforce strategies. Thus, a state strategy should focus on the needs of business and industry.

Three key recommendations are outlined below. Sector-specific opportunities in energy, forestry, manufacturing, sustainable aviation fuels, transportation, and waste and wastewater sectors follow.

### Grow New Industries, Businesses

- Implement the Minnesota Council on Economic Expansion's recommendations to expand businesses:<sup>8</sup>
- Implement recommendations outlined within this report for the Sustainable Aviation Fuels and Forestry sectors; these represent promising business opportunities that will foster economic growth in Minnesota.

### Leverage and Augment Minnesota's Educational and Workforce Training Infrastructure

- Consider utilizing the Governor's Workforce Development Board (GWDB) and Minnesota P-20 Education Partnership to better leverage and align the infrastructure that exists across DEED, DLI, MDE, DHS, and MN State Colleges & Universities.
- Agencies should consider setting policies that establish family-sustaining wage attainment as a key performance indicator to ensure that job placement for workforce participants is helping individuals achieve sustainable incomes.
- Increase partnerships between businesses, education institutions, community-based organizations, local chambers or industry associations, and other workforce partners to provide for greater collaboration and impact including increased access to relevant training for career seekers across Greater Minnesota.
- Implement recommendations outlined in the MBVC's Career and Technical Education in High Schools Working Group.<sup>9</sup>
- Implement the 2020 Energy Utility Diversity Stakeholder Report recommendation to expand and or replicate community and school-based programs that support STEM learning. In the energy space, that includes mentoring programs such as the Future Cities Competition, which pairs energy utility professionals with students to provide STEM tutoring and career pathways guidance.<sup>10</sup>

<sup>8</sup> *Minnesota's Moment: Roadmap for Equitable Economic Expansion*. Minnesota Council on Economic Expansion, Jun. 2022, [https://mn.gov/deed/assets/governors-council-economic-expansion-roadmap-acc\\_tcm1045-535818.pdf](https://mn.gov/deed/assets/governors-council-economic-expansion-roadmap-acc_tcm1045-535818.pdf). Page 15.

<sup>9</sup> *Career & Technical Education in High Schools Working Group: Final Report and Recommendations*. Minnesota Business Vitality Council, July 2020, [https://mn.gov/deed/assets/cte-final-recommendations\\_tcm1045-497678.pdf](https://mn.gov/deed/assets/cte-final-recommendations_tcm1045-497678.pdf).

<sup>10</sup> *Energy Utility Diversity Stakeholder Group Report*. Energy Utility Diversity Stakeholder Group, Jan. 2020, <https://www.lrl.mn.gov/docs/2020/mandated/200077.pdf>.

## Support Inclusion Strategies and Address Barriers to Work in a Changing Economy

- Review existing training and apprenticeship opportunities to ensure they are accessible to and inclusive of all people. Evaluate the barriers to an equitable representation of Minnesotans, particularly as they engage with hiring partners. Partner with local groups and community-based organizations to recruit diverse candidates and provide supports after placement to help with retention.
- To promote equitable outcomes and to ensure impact, State workforce initiatives should prioritize training in careers leading to a family-sustaining wage, equip participants with transferrable skills that carry value beyond a single job or with a single employer, leverage new training and relevant industry technology, and, where feasible, track outcomes like employment, wage increases, and retention.<sup>11</sup>
- As the Energy Utility Diversity Stakeholder Report stated, employers could review their existing recruitment and hiring practices to ensure that job-entry requirements are appropriately aligned with the actual requirements of the job. Special attention should be paid to acknowledging and removing existing barriers.<sup>12</sup> Additionally, interview practices should be reviewed to eliminate bias.
  - One existing effort that could be further supported and expanded is the CareerForce Inclusive Workforce Employer (I-WE) initiative, which was developed in partnership between DEED and several local workforce development boards to help employers become inclusive employers and attract more diverse talent.<sup>13</sup>
  - Consider funding more partnerships between community-based organizations and employers that are designed to provide services and supports to both workers (placed via the program) and employers (who hire participants from programs) after participants have been placed into employment. Employers who are having a difficult time recruiting or retaining workers from certain communities may benefit, while career seekers from these communities could then receive additional supports to help them maintain employment.
- Address barriers to safe and reliable childcare across the state, which disrupts workforce participation. Implement recommendations from the MBVC sprint on childcare.<sup>14</sup>



<sup>11</sup> *Putting California on the High Road*. California Workforce Development Board, Jun. 2020, <https://laborcenter.berkeley.edu/wp-content/uploads/2020/09/Putting-California-on-the-High-Road.pdf>.

<sup>12</sup> *Utility Diversity Stakeholder Group*, 2020.

<sup>13</sup> *Inclusive Workforce Employer (I-WE) Designation*. Minnesota Department of Employment and Economic Development, 2022, <https://www.careerforcemn.com/InclusiveWorkforceEmployer>.

<sup>14</sup> *Child Care Business Supports Working Group – Final Report and Recommendations*. Minnesota Business Vitality Council, Apr. 2022, [https://mn.gov/deed/assets/child-care-mbvc-report-acc\\_tcm1045-526238.pdf](https://mn.gov/deed/assets/child-care-mbvc-report-acc_tcm1045-526238.pdf). Page 6.



## ENERGY SECTOR

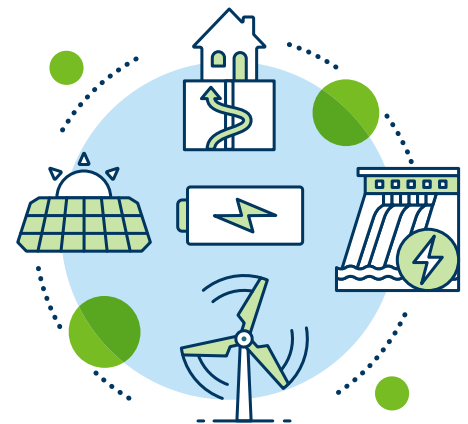
### *High-Skill, High-Demand Jobs: Maximizing Wins for Minnesotans*

Careers in energy represent a win-win-win opportunity: Strong earning potential, a career that is in-demand, and the opportunity to make a meaningful contribution to addressing climate change. Focusing on in-demand energy efficiency occupations represents the largest near-term opportunity for Minnesota and Minnesotans. Supporting and augmenting existing training and career exposure programs that teach foundational skills linked to these in-demand careers is critical. The tight labor market coupled with impending retirements is a clear opportunity to increase access to jobs for those traditionally underrepresented in these occupations.

## INSIGHTS

### Energy Efficiency and Construction Dominate Energy Jobs

For the purposes of this report, energy jobs are defined as jobs associated with heating and electricity generation and transmission, that contribute to designing, manufacturing, installing, maintaining, and/or selling products or services that increase energy and resource efficiency (such as retrofitting buildings). The U.S. Energy and Employment Report (USEER), Energy Employment by State: 2021, found that, in 2020, energy efficiency was the largest category of energy jobs in Minnesota – with over 41,000 jobs (see *Table 2*).<sup>15</sup> Solar, wind and other energy installation and generation jobs made up just under 13,000 jobs, while transmission, distribution and storage comprise over 21,000.



**TABLE 2: JOBS BY MAJOR ENERGY TECHNOLOGY IN MN – 2020**

Technology	Jobs
Energy Efficiency	41,148
Transmission, Distribution and Storage	21,993
Electric Power Generation	12,956

Of those jobs in energy efficiency, most are in the construction industry. According to USEER, the largest numbers of workers are in high-efficiency HVAC and renewable heating and cooling firms, followed by ENERGY STAR and efficient lighting.<sup>16</sup> Construction is also the largest sector of employment in electric power generation.<sup>17</sup>

*The Minnesota Energy Efficiency Potential Study* found that more than half of Minnesota energy efficiency employment is concentrated in the Twin Cities metro area, where building density is greatest, and outside of the metro area, jobs are relatively evenly dispersed.<sup>18</sup> A complete listing of energy efficiency employment by location is detailed in *Table 3*. However, comprehensive data is not available on energy efficiency-related contractors' service areas within the state, making it difficult to pinpoint gaps in the availability of businesses or workers for a particular region or community. The Minnesota State Legislature has not funded a training and workforce plan since 2009.<sup>19</sup>

<sup>15</sup> *Energy Employment by State: 2021 - United States Energy and Employment Report (USEER)*. United States Department of Energy, 2021, <https://www.energy.gov/sites/default/files/2021-07/USEER%202021%20State%20Reports.pdf>, page 163.

<sup>16</sup> USEER, 2021, page 167.

<sup>17</sup> USEER, 2021, page 164.

<sup>18</sup> *Minnesota Energy Efficiency Potential Study: 2020-2029*. Center for Energy and the Environment, 2019, <https://mn.gov/commerce-stat/pdfs/mn-energy-efficiency-potential-study.pdf>, page 6.

<sup>19</sup> *Training Minnesota's Energy Workforce*. Minnesota Department of Commerce, 2012, page 5.



TABLE 3. ENERGY EFFICIENCY EMPLOYMENT IN MINNESOTA BY LOCATION<sup>20</sup>

Area	Jobs
Minneapolis, St. Paul, Bloomington	25,554
Rural Minnesota	12,722
St. Cloud	1,732
Duluth	1,670
Rochester	1,566
Mankato-North Mankato	837
Moorhead	366
East Grand Forks	245
Winona	166



Strong Growth is Projected for Energy Jobs

At the time of the 2021 USEER publication, many Minnesota energy-related businesses reported an expectation of job growth over the next year, as detailed in Table 4. The Energy Utility Diversity Stakeholder Group 2020 Report similarly reported that the group’s members discussed potential future growth in the employment of electricians, HVAC technicians, engineers, and data scientists, as well as multilingual workers with cross-cultural competency.<sup>21</sup>

TABLE 4: PROJECTED GROWTH BY MAJOR TECHNOLOGY APPLICATION - 2020<sup>22</sup>

Technology	State projected growth in the next 12 months (percent)	U.S. projected growth in the next 12 months (percent)
Electric Power Generation	10.8	8.1
Electric Power Transmission, Distribution, and Storage	6.4	4.2
Energy Efficiency	4.7	10.1

Signed into law by President Biden in August 2022, the IRA will increase demand from Minnesotans for highly efficient heating and cooling in addition to other money-saving technologies such as rooftop solar. The IRA makes it more affordable for Minnesota families to purchase energy efficient appliances, make repairs to their homes, and save money on their utility bills. For example, in Minnesota, millions of low- and moderate-income households are eligible for rebates to cover up to 100 percent of the cost of installing a highly efficient water heater.

The IRA is also estimated to bring \$8.5 billion of investment in large-scale clean power generation and storage to Minnesota between now and 2030.<sup>23</sup> The White House estimates that 180,000 additional Minnesota households will install rooftop solar panels resulting from the legislation.<sup>24</sup>

Another area of potential job growth is supported by funding in the Weatherization Assistance Program Bipartisan Bill which significantly increases funding to the long-running energy efficiency program over the next five years. This increase in funding will drive additional energy auditor and quality control inspection jobs as well as opportunities for mechanical and shell contractors for which demand has already outpaced workforce availability.

<sup>20</sup> Energy Efficiency Study, 2019, page 8.

<sup>21</sup> Utility Diversity Stakeholder Group, 2020, page 19.

<sup>22</sup> USEER, 2021, page 169.

<sup>23</sup> The Inflation Reduction Act Delivers Affordable Clean Energy for Minnesota. WhiteHouse.Gov, 2022, <https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/17/state-fact-sheets-how-the-inflation-reduction-act-lowers-energy-costs-create-jobs-and-tackles-climate-change-across-america/>. Page 1.

<sup>24</sup> ibid



### Average Energy Wages are Higher than Median Wages

According to the 2021 USEER, the median wage for all Minnesota energy workers (as defined by that report)<sup>25</sup> is \$27.22, 42 percent above the national median wage of \$19.14.<sup>26</sup> The USEER jobs data does not provide information on specific occupations. However, publicly available North American Industry Classification System (NAICS) codes-based labor market information, which is data reported by employers, does provide a snapshot of the hundreds of energy-related occupations. These occupations are outlined in *Table 5* and consist of blue-collar energy-related occupations in the construction trades with greater than 2,000 existing jobs that contribute to sustainable practices, don't require post-secondary education, have strong median wages,<sup>27</sup> and have a projected positive future job growth. Job pathways and actual career opportunities can vary.

TABLE 5: ENERGY-RELATED OCCUPATIONS, CONTRIBUTING TO SUSTAINABILITY, OVER 2,000 JOBS: 2020 NAICS DATA<sup>28</sup>

Occupation	Number of jobs	50th percentile wage	Occupation employment percent change, 2020-2030	Percentage male; white
Plumbers	8,415 in residential retrofitting	\$39.02	5% nationally (MN unavailable)	Unknown
Electricians	7,669 in residential retrofitting	\$31.81	8.1% increase in MN	96.6% male, 95.7% white
Carpenters	5,329 in residential building construction, 3,352 in nonresidential	\$28.78	1.3% increase in MN	98.07% male, 93.72% white
Heating, air conditioning, and refrigeration mechanics and installers	2,899 in residential retrofitting	\$30.49	5% increase nationally (MN unavailable)	98.1% male, 95.4% white

### Women and People of Color are Underrepresented

As detailed in *Table 5*, women and people of color are underrepresented in plumbing, carpentry, electrical and HVAC installer and technician careers. According to a recent report by the Center for Energy Efficiency and the Environment, “the energy efficiency industry is even less diverse than the overall state workforce, lacking both gender and racial diversity. Women represented less than a third (23 percent) of the energy efficiency workforce in 2017, and people of color represented an even smaller fraction.”<sup>29</sup> According to the Minnesota Department of Labor and Industry (DLI), currently 21.5 percent of apprentices in construction registered apprenticeship programs are people of color, while only seven percent are women.<sup>30</sup> Multiple stakeholders in the construction trades interviewed by this working group stated the need for greater diversity, and how challenging it has been to produce a diverse trained workforce.



Increasing veteran participation in registered apprenticeship programs should similarly be addressed by the State.

<sup>25</sup> a broader definition than this analysis, as it includes electric power generation; transmission; distribution, and storage; fuels; energy efficiency; and motor vehicles

<sup>26</sup> USEER, 2021, page 163.

<sup>27</sup> a median wage above the state average of \$16.21 (for a single person with no children)

<sup>28</sup> “Data Center.” Minnesota Department of Employment and Economic Development Labor Market Information Office, <https://mn.gov/deed/data/>. Accessed Sep. 2022.

<sup>29</sup> Minnesota Energy Efficiency Workforce Gap Analysis. Center for Energy and the Environment, Feb. 2019, <https://www.mncee.org/sites/default/files/report-files/MN-Energy-Efficiency-Workforce-Gap-3-1-19.pdf>, page 5.

<sup>30</sup> “Apprenticeship Minnesota.” Minnesota Department of Labor and Industry, <https://www.dli.mn.gov/about-department/our-areas-service/apprenticeship-minnesota>, Accessed 2022.



Representation of veterans in electrical and HVAC careers is not systematically collected, though the Helmets to Hardhats program works to connect veterans to apprenticeship training programs registered with DLI and job opportunities in the construction industry. Table 6 shows the results from the program’s 2021 report.

TABLE 6: MINNESOTA VETERAN PARTICIPATION (REGISTERED WITH DLI)<sup>31</sup>

	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021
Active veteran apprentices, all industries	688	809	938	831	801
Active veteran apprentices in the construction industry	604	703	775	703	700
Veteran unemployment rate	NA	NA	3.20%	5.90%	4.20%

### Energy-Related Training and Education Infrastructure is Varied

This analysis focuses on several careers within the breadth of energy occupations – electrician and HVAC installer/technician. In 2012, the Minnesota Department of Commerce (DOC) worked with numerous stakeholders to create a compendium of energy efficiency and renewable energy training initiatives in Minnesota. Funding was provided by the American Reinvestment and Recovery Act of 2009 and authorized by Minnesota law.<sup>32</sup> The plan was intended as a working, active resource, but due to insufficient resources has fallen out-of-date.<sup>33</sup> While there is no comprehensive one-stop public resource for training and educational opportunities related to the energy sector in Minnesota, considerable training and education exists for energy occupations broadly. There are also numerous industry, education, and labor partnerships in the energy space, though they are specific to an industry.



### Minnesota Energy Consortium

For example, the Minnesota Energy Consortium was formed in 2005 by energy industry leaders and Minnesota State<sup>34</sup> as they analyzed projected workforce shortages regarding energy generation and utilities. The partnership continues to work with energy utilities, Minnesota State, and state agencies to develop career pathways, build formal relationships within the workforce system, ensure a solid pipeline of students, improve the accuracy of workforce data, and build relationships with contractors.

### Minnesota State Energy Center of Excellence

The Minnesota State Energy Center of Excellence is an education resource for energy-related careers. It is a consortium of two- and four-year institutions that engage with industry to enhance education and promote energy careers through various activities and partnerships. The center’s work includes career pathways for both traditional and renewable energy careers and they maintain a listing of energy-related training opportunities through Minnesota State, the majority focus on renewable energy production and energy-efficient building and maintenance. Some programs specifically prepare workers for jobs in clean energy fields such as solar panel installation and wind turbine maintenance. Meanwhile, many traditional programs, such as carpentry and interior design, have been enhanced to include competencies such as energy-efficient building and design methods.

<sup>31</sup> Helmets to Hardhats Initiative, Annual Report for 2021. Helmets to Hardhats, 2021, page 4.

<sup>32</sup> Laws of Minnesota 2009, Chapter 138, Article 5, Section 1.

<sup>33</sup> Training Minnesota’s Energy Workforce, 2012.

<sup>34</sup> formerly Minnesota State Colleges and Universities





## College Programs, Degrees, and Certifications

Four colleges in the Minnesota State system collaborate to offer the energy technical specialist associate in applied science degree. Students take core courses that provide them with competencies needed across a wide range of energy industries, including electric generation from fossil fuels, wind power, solar energy, and biofuels production. Students also select from courses specific to each of these energy industries, enabling them to receive both the energy technical specialist general degree and a certificate in a specialty area within two years.



Though less visible, the most widespread impact occurs when traditional programs are redesigned to reflect a more sustainable economy. From carpentry to chemistry, many programs across the Minnesota State system have been modified to provide graduates with high-demand skills in energy-efficiency and conservation. Beyond these degree programs, colleges in the Minnesota State system also provide some short-term training programs and often serve as the training provider for customized training programs administered to support a business or industry, such as the Dual-Training Pipeline program. Customized training can provide valuable skilling or upskilling for employers, but there is little to no financial benefit for most colleges to provide customized training based on funding structures and allowable costs for most customized training grants. In many cases, this could effectively serve to disincentive many colleges from focusing time, and other resources to develop or provide more customized training for local employers.

Fond Du Lac Tribal and Community College prepares students for certification through the Building Performance Institute (BPI). BPI's building envelope professional and envelope professional certifications are increasingly seen the standard for training in residential building performance. Leech Lake Tribal College provides training related to solar installation.

The University of Minnesota helps prepare the energy workforce both broadly through sustainability education and more specifically through research and education related to the development of a renewable energy and energy efficiency. For example, the School of Architecture at the University of Minnesota offers a Master of Architecture - sustainable design track, which provides a diverse offering of courses on sustainable design technology, theory, and practice.



## Apprenticeship Programs

Program sponsors, either employer led, or joint labor/management led, have invested in a robust system to train workers in the trades occupations through the earn-as-you-learn registered apprenticeship model, including the occupations outlined in *Table 5*, with strong linkages to technical colleges. Apprenticeship programs provide workers with a nationally recognized credential and high-skill, high-wage jobs and are in high demand. In one recent application round, an apprenticeship program received 125 applications for 40 slots.<sup>35</sup>

Apprenticeship programs provide foundational skills and training, and as technology changes, these programs can adapt. For example, the St. Paul Steamfitters and Pipefitters Local 455 invested in a state-of-the-art geothermal system at their Apprenticeship Training Center. It's estimated this technology will use 80 percent less energy for air conditioning and cut their electricity and gas use in half. In addition to their pipefitting apprenticeship, the St. Paul Steamfitters and Pipefitters Local 455 Joint Apprenticeship Training Committee (JATC) offers a five-year heating, ventilation, air conditioning and refrigeration apprenticeship. The training center also offers all union members continuing education opportunities to earn certifications and gain hands-on experience with new technologies, such as the new geothermal system.<sup>36</sup>

<sup>35</sup> Stakeholder Interviews. Conducted by MBVC Business Growth and Family Sustaining Job Opportunities in a Changing, More Sustainable Economy Working Group Stakeholder. Aug. 5, 2022.

<sup>36</sup> *Apprenticeship Works*. Apprenticeship Minnesota, Issue No. 36, Summer 2021, <https://www.dli.mn.gov/sites/default/files/pdf/appr-works-summer21.pdf>.



## Other Career Exposure Opportunities Engaging the Next Generation of Workers

There are several initiatives aimed at engaging the next generation of workers, though they are often limited in reach by lack of funding. Unions, community-based organizations, and construction employers each collaborate to engage high school students in safe, hands-on learning opportunities. As of December 2021, there were 132 high schools across the state that had a registered construction pathway program with the Minnesota Department of Education (MDE).<sup>37</sup>



Other examples include:

1. The Operating Engineers provide a virtual academy available to all high school students across Minnesota, with an industry driven curriculum, high school elective credit, and college credit from Hennepin Technical College.<sup>38</sup>
2. According to the Energy Utility Diversity Stakeholder Report, “some utilities offer paid internship and apprenticeship programs that help to identify and nurture professional skills among diverse youth groups. Both CenterPoint Energy and Xcel Energy have hosted AchieveMpls and Step Up high-school interns, who represent diverse communities in Minneapolis. Xcel Energy also participates in Right Track, another high school internship program.”<sup>39</sup>
3. The MN Trades Academy is a paid summer construction internship experience for high school students from the Twin cities metro area. The Summer 2021 program had six female participants, which is 25 percent of the total and 40 percent of participants were non-white.<sup>40</sup>
4. Several high schools in Minnesota are Construction Apprenticeship Preparation (CAP) schools that utilize the Multi-Craft Core Curriculum, which provides a pathway towards a construction career through an apprenticeship-readiness training curriculum.<sup>41</sup> Programs and services supported by grant funds must give priority to individuals and groups that are economically disadvantaged or historically underrepresented in the construction industry, including but not limited to women, veterans, people of color, and immigrant groups. Current participating school systems include White Bear Lake Public Schools, Moundsview Public Schools, Eagan High School, and Roosevelt High School (Minneapolis).<sup>42</sup>
5. The Construction Careers Foundation offers the Learn2Build program, which is a summer learning experience through youth community organizations and schools for middle school students, to expose them to construction career options.<sup>43</sup> The three school districts they have partnered with have very diverse student populations.<sup>44</sup>
6. Project Build MN also works to educate young people, school counselors, and teachers on the benefits of a career in the construction trades, providing outreach materials and educator resources.<sup>45</sup>

<sup>37</sup> *Construction Careers Foundation: Annual Report to DEED, July 2020 – October 2021*. Construction Careers Foundation, 2022, [https://mn.gov/deed/assets/sfy21-construction-careers-acc\\_tcm1045-521501.pdf](https://mn.gov/deed/assets/sfy21-construction-careers-acc_tcm1045-521501.pdf), page 16.

<sup>38</sup> Stakeholder Interviews. Conducted by MBVC Business Growth and Family Sustaining Job Opportunities in a Changing, More Sustainable Economy Working Group Stakeholder. Aug. 26, 2022.

<sup>39</sup> *Utility Diversity Stakeholder Group*, 2020, page 24.

<sup>40</sup> *Construction Careers Annual Report*, 2022, page 19.

<sup>41</sup> *The Building Trades’ Multi-Craft Core Curriculum*. Construction Careers Foundation, 2017, <https://nabtu.org/wp-content/uploads/2017/08/MC3-in-Our-Schools-A-Guide-for-Students-and-Parents.pdf>.

<sup>42</sup> *ibid.*

<sup>43</sup> *Construction Careers Annual Report*, 2022, page 9.

<sup>44</sup> *Construction Careers Annual Report*, 2022, page 11.

<sup>45</sup> “Your Future in the Trades Begins Here.” *Project Build MN*, <https://projectbuildmn.org/>, Accessed Sep. 2022.



## Qualified Worker and Contractor Shortages and Perceptions Proliferate

The strong system of existing industry, labor, education, and workforce training programs and opportunities has the potential to work together across silos to identify what careers are in-demand, ensure that an adequate supply of workers is trained in those careers and upskilled to meet changing technologies, and that opportunities are accessible to all, particularly historically excluded workers.

The status quo, however, indicates that many employers in the energy sector are reporting difficulty finding and recruiting qualified workers. Results of the *2021 USEER Report* indicated that 89.4 percent of energy employers in Minnesota reported “very difficult” or “somewhat difficult” hiring difficulty.<sup>46</sup> A 2020 report from the Energy Utility Diversity Stakeholder Group Report found that the most cited reason for challenges in hiring workers was lack of experience, training, or technical skills, and competition.<sup>47</sup> Further bolstering these workforce issues, the Center on Energy and the Environment’s (CEE) *Minnesota Energy Efficiency Workforce Gap Analysis* reported that small energy efficiency companies have challenges connecting with the existing workforce system. The CEE report states, “few of the small- and mid-size energy efficiency employers interviewed had ever engaged with their local workforce system representatives, despite having persistently unmet hiring needs. Small employers, particularly those who are short-staffed because they are struggling to hire, don’t have the time or ability to participate in workforce planning conversations.”<sup>48</sup>



These conclusions can be witnessed throughout many jobs and fields within the energy industry. For example, the *Minnesota Energy Efficiency Potential Study: 2020-2029* discusses construction labor shortages, stating, “29 percent of skilled construction workers will retire by 2026 and 41 percent will have retired by 2031. This volume of retirements paired with employers’ current and persistent challenges in finding enough applicants poses a threat to Minnesota reaching its efficiency potential. At the same time, the number of open positions represents an opportunity to include more women and people of color, groups that are currently underrepresented.”<sup>49</sup> Similarly, the 23 local service providers for the Weatherization Assistance Program that cover the entire state identified that there are currently 284 contractors actively involved in the weatherization network. With the recent increase in federal funding, a survey, conducted by the Minnesota Department of Commerce (DOC) in January of 2022 identified that there is a current need for an additional 173 contractors to complete weatherization work.

## Workers Experience Barriers to Accessing In-Demand Careers

Prospective workers can experience significant obstacles to obtaining training and certifications needed to obtain a job as an electrician or HVAC installer or in other construction trades. These barriers contribute to the lack of diversity. Barriers include:

- Both training center and job site locations vary considerably, meaning the worker most likely will need a driver’s license and a reliable car. Bus commute times or not enough transit options exacerbate this problem. Many interviewees cited this as a principal barrier, in particular the costs associated with owning a car and the availability of driver’s license training and support.
- Workers may experience seasonal unemployment.
- Early and long job hours can mean availability of safe and reliable childcare is a challenge.

<sup>46</sup> *USEER, 2021*, page 7.

<sup>47</sup> *Utility Diversity Stakeholder Group, 2020*, page 16.

<sup>48</sup> *Gap Analysis, 2019*, page 7.

<sup>49</sup> *Energy Efficiency Potential Study, 2019*, page 14.



- Many training programs have defined time periods to apply, which can limit accessibility.
- Apprenticeship programs and technical college construction trades programs may have a considerable waiting list, making it that much harder for traditionally underrepresented populations to successfully enroll.
- Many apprenticeship programs require a level of math such as applied mathematics and basic algebra – some apprenticeship training directors that were interviewed noted that many applicants fail this requirement. One individual noted they had over 100 people apply to a training opportunity but very few of them could pass a basic math test.<sup>50</sup>



## RECOMMENDATIONS

The recommendations are based on an analysis of relevant reports, labor market information, interviews with leaders from labor unions, apprenticeship programs, nonprofit workforce entities, nonprofit energy efficiency providers, workforce development boards, Tribal Nations, higher education, business associations, and other industry and business representatives.

### **Assess Contractor, Worker Supplies Throughout the State, Linked to Education and Training Opportunities**

- DEED should utilize Minnesota Jobs Skills Partnership (MJSP) research funding or request funding from the legislature, in partnership with DOC the Office of Higher Education (OHE), Minnesota State, DLI, and labor and industry training partnerships to revitalize comprehensive training opportunities for the energy workforce in Minnesota starting with:
  1. Inventory current training initiatives and employment needs by region for energy efficiency employers, including weatherization auditors and quality control inspectors, building shell contractors, HVAC contractors, electricians, asbestos abatement contractors, and solar contractors.
  2. Catalogue higher education, nonprofit and labor training programs, and certifications they offer for energy efficiency careers, including residential weatherization.
  3. Identify gaps in accessibility and whether they meet employer need and future job projections. This unprecedented collaboration between potentially disparate silos of workforce development, energy, education, and training can leverage thousands of dollars by eliminating duplication, listening to industry, and removing barriers to developing a trained workforce.
- DOC should convene all utilities subject to the Conservation Improvement Program to voluntarily provide disaggregated data on jobs associated with their programs, by gender, race, and ethnicity, as well as average wage and benefits, by occupation. The DOC should then aggregate and provide a state-wide picture of the current diversity supporting the Conservation Improvement Program.

<sup>50</sup> Stakeholder Interviews. Conducted by MBVC Business Growth and Family Sustaining Job Opportunities in a Changing, More Sustainable Economy Working Group Stakeholder. Aug. 24, 2022.



### Enhance Inclusion Strategies

- Several utilities have implemented strategies to improve access to jobs—other energy-related employers should follow suit. For example, employers may consider implementing a collaborative model like the Energy Utility Diversity Stakeholder Report recommendation, which is specific to utilities. According to the report, utilities could jointly devote resources to:

“New methods of reaching particular diverse groups through existing energy services. For example, utilities might integrate information about career opportunities into the provision of their services such as energy efficiency upgrades in underrepresented communities; 2) Coordinated and targeted marketing campaigns to build awareness of the utility industry, especially within low-income communities, immigrant communities, and communities of color. 3) Establishing “energy experience centers” located in accessible locations, including Opportunity Zones, within underrepresented communities in order to ensure access and expose youth and adults to energy technologies and educational opportunities, and to create hubs where interested individuals and businesses could connect with utilities, vendors, and training providers.”<sup>51</sup>



- Establish additional pilots within geographic areas or specific business opportunities such as Xcel Energy’s Power Up Training Program, a pilot intended to provide training and career pathways for 150 diverse participants, including hands-on experience working on the 460 MW Sherco Solar Project.<sup>52</sup>
- Support and expand efforts such as Building Strong Communities, a multi-trade apprenticeship readiness program that prepares women, people of color, and veterans to enter apprenticeship programs for careers in the construction trades. Program graduates have an opportunity to interview for a construction trade, lowering a significant barrier for historically underrepresented populations.

### Boost Efforts and Capacity to Upskill Workers

- DEED, or a trusted third party such as a trade organization or nonprofit, can support smaller employers in banding together to get training needs met. According to the Center for Energy and Environment 2019 report, interviews with workforce strategists noted success when a group of small businesses collectively approached the workforce system with overlapping hiring needs. “We started with the employers and then backed it up,” one interviewee said. “We took a like-group of [welding] employers and were able to fund a customized training program to give students the basic skills they needed to be hired.”<sup>53</sup> In an interview, a trade organization director indicated that contractors look to training provided by peers, and their members are asking for training on basic skills that the trade organization could provide via video modules, if they had some financial support.<sup>54</sup>
- Provide grant funding to registered apprenticeship programs to upskill workers through training on the latest green technologies and equipment. In order to keep pace with evolving technologies, training centers and sponsors need the latest curricula and equipment to train apprentices and incumbent workers. For example, the Minneapolis Electrical JATC has incorporated the Electric Vehicle Infrastructure Training Program into their continuing education for licensed electricians, resulting in a certification specific to installing, operating, and maintaining electric vehicle charging stations. Providing funding for electrical programs to purchase an EV charging station for training purposes is one example of how State dollars could support upskilling workers.

<sup>51</sup> *Utility Diversity Stakeholder Group*, 2020, page 16.

<sup>52</sup> *Minnesota Public Utilities Commission Approves Training Program Aimed at Increasing Workforce Diversity in the Energy Sector*. Minnesota Public Utilities Commission, Jan. 2022, <https://mn.gov/puc/about-us/news/archives/?id=14-515318#/detail/appld/1/id/515318>.

<sup>53</sup> *Gap Analysis*, 2019, page 7.

<sup>54</sup> Stakeholder Interviews. Conducted by MBVC Business Growth and Family Sustaining Job Opportunities in a Changing, More Sustainable Economy Working Group Stakeholder. Aug. 16, 2022.



## Boost Future Workforce by Engaging Students and Current Workers

- DEED, DLI, DOC, and MDE could partner with private sector stakeholders on a public awareness campaign to promote in-demand careers such as electrician and HVAC careers. This would require new funding from public and private sources.
- Expand existing career exposure programs for high school students, and establish new initiatives where needed. For example, more schools could participate in Construct Tomorrow to expose students to construction careers and more high schools could utilize the Multi-Craft Core Curriculum.
- Explore establishing a multi-trade, virtual, or otherwise highly accessible “registered apprenticeship 101” course for high school students to increase awareness of registered apprenticeship as a viable career pathway. DLI could also increase outreach to high school students and counselors regarding the benefits of registered apprenticeship.
- The Energy Utility Diversity Stakeholder Report recommends: “Expanding and/or replicating community and school-based programs that support STEM learning, like the Center for Energy Workforce Development (CEWD) school curriculum or mentoring programs such as the Future Cities Competition, which pairs energy utility professionals with students to provide STEM tutoring and career pathways guidance. Utilities can further support STEM education by engaging with these facilities.”<sup>55</sup>
- Establish an accessible career pathway tool for job seekers, so they can view all career options within a specific energy sector and compare two careers within a sector to learn how career advancement opportunities are possible. Any developed tool should be resourced to keep the information up to date. A decade ago, training maps were developed and launched on the iSEEK energy careers website, which could be an illustrative example for any future initiative.<sup>56</sup>

## Reduce Barriers by Enhancing Programs and Supports that Enable Apprenticeship Readiness

- DLI should examine and support apprenticeship readiness programs with a track record of success, and work with other State agencies, schools, industry, and labor on career exploration and career pathways programs related to energy. For example, ComEd, a utility in Illinois, created a solar training pipeline program for over 400 students in partnership with the International Brotherhood of Electrical Workers (IBEW), to put high school students on a path to careers in the electrical industry.<sup>57</sup>
- Support industry, labor, and community-based organizations in developing apprenticeship readiness supports such as basic math education, to enable more people, including those from diverse populations, to qualify for apprenticeship programs. For example, many construction trade apprenticeship programs require a math skills assessment and applicants fail to qualify because they can’t meet the math skill requirements.<sup>58</sup>
- Expand efforts to provide access to a driver’s license and an affordable, reliable vehicle. The Construction Careers Foundation (CCF) recently piloted a program to increase access to driver’s licenses in partnership with White Bear Lake Public Schools. Fourteen youth who participate in the schools Construction Career Pathway curriculum, completed the program. Of those, eight went on to pass their permit test and scheduled a behind the wheel test. CCF is currently seeking to expand the program to schools or on a larger scale through other means.<sup>59</sup>

<sup>55</sup> *Utility Diversity Stakeholder Group*, 2020, page 18.

<sup>56</sup> *Training Minnesota’s Energy Workforce*, 2012, page 31.

<sup>57</sup> Galford, Chris. “ComEd Training Programs Yielded Clean Energy Job Preparation for more than 681 Illinois Residents Last Year.” *Daily Energy Insider*, Jul. 12, 2022, [https://dailyenergyinsider.com/news/35802-comed-training-programs-yielded-clean-energy-job-preparation-for-more-than-681-illinois-residents-last-year/?utm\\_medium=email](https://dailyenergyinsider.com/news/35802-comed-training-programs-yielded-clean-energy-job-preparation-for-more-than-681-illinois-residents-last-year/?utm_medium=email). Accessed Aug. 2022.

<sup>58</sup> Stakeholder Interviews. Aug. 5, 2022.

<sup>59</sup> “White Bear Lake Area Schools Embraces Construction Careers Pathways for Middle and Senior High Students.” Construction Careers Foundation, <https://constructioncareers.org/white-bear-lake-area-schools-embraces-construction-careers-pathways-for-middle-and-senior-high-students/>. Accessed Aug. 2022.



## FORESTRY AND FOREST INDUSTRY SECTOR

### *A Foundation of the State's Economy: Capitalizing on Sustainable Practices*

The forest industry<sup>60</sup> in Minnesota is a complex and foundational part of the State economy. While North American Industry Classification System (NAICS) code analysis reveals a small subset of a few hundred “core” forest and forest products jobs, the broader tapestry of public and private sector jobs that manage, work, and use the state’s 17.6 million acres of forest lands represent the state’s fifth largest manufacturing employment sector. An annual forest industry survey<sup>61</sup> points to over 69,000 jobs in the industry, producing \$17.4 billion in gross sales.

Minnesota’s forests have a complicated and multifaceted relationship with the realities of climate change. Trees store carbon, they experience stress and damage from climate change, and they are a resource in an economic sector with a history of sustainable management. The Minnesota Department of Natural Resources (DNR) and U.S. Department of Agriculture Forest Inventory and Analysis (FIA) regularly survey Minnesota’s forest resources and produce an annual report. According to FIA, in 2019 the state had 28 million more large trees (19” or greater diameter) than it did 65 years ago. The report notes that Minnesota industry and fuelwood users harvested and used approximately 2.8 million cords of wood that year, consistent with trends in recent years; meanwhile, net growth for all species continued to outpace harvest (and other mortality) levels at 5.65 million cords. This recent data is reflective of a trend lasting at least two decades. The management practices underlying these success stories represent dozens of different resilient jobs, all interconnected and requiring varying levels of education and training.



The variety of forest industry jobs is due in part to the fact that multiple sectors contribute to the industry in fundamental ways. Based on DNR tracking, 30 percent of all wood fiber consumed at Minnesota mills comes from public lands administered by the DNR, with the DNR managing 24 percent of the state’s forests. Other public land managers include the US Forest Service (17 percent) and county land departments (15 percent). Pulp and paper mills, converted paper products plants, sawmills and wood products plants, wood kitchen cabinet and countertop manufacturers, wood furniture shops, and custom architectural woodwork shops all employ thousands of different workers with job-specific skills and knowledge and those are all changing due to the continued advancement of technology within the field.

## INSIGHTS

### **The Industry’s Processes and Needs are Complex and Evolving**

Few Minnesotans understand the nature of forest management and related industries. A great deal of this work, particularly harvest operations, take place in remote locations with difficult access. The specialized knowledge, skills, abilities, and expensive equipment necessary to invest and operate in the industry require a great deal of time and experience to acquire and maintain. Not unlike family farms, family-owned forestry operations often gain this experience by undertaking substantial risk and passing on the business through the family. Variance in harvests can happen due to a wide range of specific weather events, overall climate, fire, insects, and other factors. At the same time, technology is evolving constantly, requiring new investments and new skills in the workforce.

<sup>60</sup> It is easy to conflate “forestry” with “forest industry”. “Forestry” is the art and science of managing forests for clean water, recreation, wildlife habitat, wood fiber, carbon storage, and other benefits; foresters are the occupation that practice forestry. “Forest industry” generally refers to the forest-based economy, including many of the forest industry jobs noted in this report. The latter group are key players in helping foresters implement forest management plans. The “forest-based economy” is the broadest possible term and spans from forest landowners (private and public) to foresters to loggers and all other occupations noted in this report.

<sup>61</sup> This data produced by Don Deckard, Ph.D., Forest Economist, in the Minnesota Department of Natural Resources document *Minnesota’s Forest Products Industry at a Glance*, updated for 2022.



About 60 percent of Minnesota’s annual harvest takes place on frozen ground, when harvesting and trucking into and out of our state’s vast forests and wetlands becomes more feasible. Land managers and foresters often restrict harvesting operations to frozen ground conditions to protect soil resources, water quality, and provide solid transport routes to the remote harvest sites. Additionally, the Minnesota Department of Transportation restricts hauling on roads seasonally due to frost leaving the roadway. Soft roadways become rutted, dangerous to travel, and are expensive to rebuild. Due to overall warming, the harvest season is trending to be shorter, leaving businesses and their workers less time to meet their harvest targets. Harvesting operations may occur during non-frozen soil conditions, but additional oversight by a forester and logging professionals is necessary to ensure forest resources are protected. High productivity becomes essential, which requires new and evolving technology.

Industry leaders see an ongoing and increasing need for skilled workers across all associated occupations – foresters, loggers, mill operators, and especially truckers. While it may seem counterintuitive to press the need for more certified truckers given their vehicles’ high use of fossil fuels, the transportation requirements for a sustainable harvest center on the trucking industry; there are no other options to move harvested timber from the forest to other either consumers or other transportation systems. Often, the same truckers who serve forestry needs across northern Minnesota also spend time as truckers for the minerals industry, which has its own set of risks and uncertainty. These external factors add variability to the number of truckers available in any given season. The forest industry experienced similar labor supply pressures during the recent oil boom in North Dakota. Other forestry occupations can experience similar externalities; the shorter and less predictable a winter harvest becomes, the higher the risk that there will be a worker shortage in one or more critical occupations for a given year.

### **Education and Training Pipeline’s are Evolving as Climate Change Impacts the Industry**

The primary pipeline within Minnesota for skilled foresters is the University of Minnesota’s Department of Forest Resources within the College of Food, Agricultural and Natural Resource Sciences (CFANS) and surrounding states’ forest management graduates.<sup>62</sup> The most relevant offerings are the Bachelor of Science and graduate degrees in Forest and Natural Resource Management. The curriculum at CFANS has evolved over time for increased focus on the impacts of climate change, the health needs of Minnesota’s forests, and what a sustainable harvest involves. It has also integrated more modern technology, including specific use of GPS technology, to prepare graduates for the needs of this high capital industry.



The Minnesota State system also has associate degree programs in forestry and related fields, ranging from General Forestry and Forest Resources Production Management to Forest Technology/Technician and Wood Science/Wood Products. Many loggers, contractors, forestry product workers, and other critical occupations get their training needs from this system at locations including Brainerd, Ely, Itasca, Leech Lake, and Vermillion.

While these schools provide outstanding education to their graduates, all parties agree that there is a significant difference between classroom (even outdoor classroom) and operational environments. A busy tree stand in the middle of a freezing winter night is a unique setting. Schools continuously seek ways to expose students to such settings, and to simulate the conditions and tools using technology.

For trucking, a Commercial Driver’s License (CDL) is the key licensure requirement, provided via testing and certification by the Minnesota Department of Public Safety. CDL training and preparation for licensure is widely available through a variety of public (including Minnesota State) and private institutions. A recent change in State policy requires candidates to have classroom training prior to testing for a CDL; this training does involve additional time and cost compared to past licensure.

<sup>62</sup> Department of Forest Resources. University of Minnesota, <https://forestry.umn.edu/>. Accessed Aug. 2022.





## State Policies Arenas Play a Necessary Role in Influencing the Industry

To support and grow the forest-based economy in Minnesota, State government policymakers should consider the broad areas in which policy can influence, or already has influenced, the industry in question. The forest-based economy has some characteristics that are unique; others are shared with many other industries. In descending order of their specificity to this industry the policy areas include the following:

### Government Management of Product Supply

The DNR manages forest lands that are the source of nearly a third of Minnesota's wood fiber. Counties and the federal government also supply substantial amounts of wood fiber to the marketplace.

DNR conducted a sustainable timber harvest analysis in 2017, and in March 2018 the agency set a ten-year sustainable target to offer 870,000 cords of timber for sale annually from DNR-managed forest lands.



### A Seasonal Cycle of Production with Heavy Presence of Externalities

Weather, climate, fire, insects, and other acts of nature can put serious economic stress on the forest industry and its workers. In instances of externalities, government intervention often plays a critical role in helping individuals and small businesses manage risk.

### A Strong Reliance on a Mobile, and Arguably Shrinking, Supply of Workers

In many parts of greater Minnesota where the bulk of forest industry jobs exist, shifting demographics are making it more challenging to find the supply of workers this industry has traditionally counted upon. Good labor market information can help support the knowledge, mobility, and willingness of economic actors to make timely and strategic changes.

### The Presence of Regulations and Requirements

A common story in industry is the presence of regulations and requirements, from safety to environmental protection, that frame industry activities and ensure communities, workers, and the business owners themselves enjoy certain protections and quality of life. The additional costs and time spent on CDL licensure is one such requirement that plays a heavy role in the availability of forestry harvest and product truckers.

## RECOMMENDATIONS

The following recommendations stem from conversations with leaders from the Minnesota Forestry Resource Council, Minnesota Timber Producers Association, and University of Minnesota, as well as the DNR's ongoing analysis of the state's timber resources and its understanding of how climate change is impacting the industry.

### Keep the Public Conversation Going

The timeline of the MBVC workgroup sprint did not allow for the full depth or breadth of stakeholder engagement that strategic and substantial policy change would require. Not only should there be more conversations with industry leaders, but State policymakers should engage a broader group of stakeholders not unlike the range of perspectives used during the analysis of sustainable timber harvest. Existing groups like the Minnesota Forest Resource Council and Minnesota Forest Resource Partnership, both formed by statute, may be key focal points for these conversations. How is climate change impacting forests? What do we want to do about it? What workforce and community needs arise from those proposed actions?



### **Implement a Forestry Jobs Working Group**

One of the two permanent groups noted above, or a new group consisting of forest industry, government, labor, education, and community leaders with a stake in a healthy forest and a healthy forest industry, could undertake a two-year mission of digging more deeply into the economic trends of the industry and developing strategies to increase the supply of skilled workers into forest-based jobs.

### **Work with the Minnesota Job Skills Partnership Board to Fund a Forestry Jobs Working Group**

The multi-sector board established in Minnesota Statutes 116L.03 is well-positioned to support a new forestry jobs promotion working group by providing information and education resources.<sup>63</sup>



### **Make Increased Workforce Diversity an Essential Component of the Forest Industry Conversation**

The occupations within and around forest industry are overwhelmingly white and male. To meet future workforce needs, the forest industry will need to increase its efforts to engage women, people of color, and immigrants in potential careers.

### **Support Funding for Evolving Curriculum at CFANS and Minnesota State**

Foresters, contractors, public policymakers, and many others need to continue to learn about what is happening to Minnesota's forests, how a sustainable harvest can help mitigate the effects of climate change, and how technology is changing the field. As such, as the industry continues to evolve, curriculum needs to mimic and keep up with these changes, particularly when it comes to prioritizing the integration of industry technological changes and the science of climate change.

### **Analyze and Consider Improvements to the CDL Licensing Procedure**

Stakeholders consistently report that licensing procedures for CDL applicants can be cumbersome and interfere with timely forestry operations. An internal review of CDL licensing procedures, including outreach to forest industry representatives and other key stakeholders, would illuminate process or requirement changes that can speed up licensing without sacrificing public safety.

<sup>63</sup> Minnesota Statutes 2022, Section 116L.05, Subdivision 3 and Section 116L.04, Subdivision 2



## MANUFACTURING SECTOR

*A Leader in a Clean and Sustainable Future: The Growth in ‘New Collar’ Jobs*

The manufacturing industry plays a significant role in clean and resilient jobs. According to the U.S. Environmental Protection Agency’s Global GHG Emissions Data, 21 percent of the global GHG emissions in the world, stems from manufacturing.<sup>64</sup> The significance of this is addressed within the recently passed IRA. The New York Times predicts that the IRA will create numerous new manufacturing factories and opportunities in the U.S. as electric energy vehicles and products are being produced.<sup>65</sup>

Minnesota already maintains a significant global presence in manufacturing with 42 percent of Minnesota’s Fortune 500 companies in the manufacturing sector.<sup>66</sup> Many of these manufacturers are taking a lead in reducing the carbon-footprint they are producing. When Newsweek released the top 100 greenest U.S. companies, four of Minnesota’s companies made that list and two of those four are in manufacturing – Medtronic and 3M.<sup>67</sup> A look at the top 500 companies shows more Minnesota-based manufacturing companies on the list.



Industry stakeholders within the state, including the Central Minnesota Manufacturer’s Association, shared many incremental changes that manufacturers in central Minnesota are performing to become more sustainable and resilient. Manufacturers are transitioning from their carbon-emitting forklifts and cherry-pickers to electric. They are saving energy as a cost saving measure by increasing energy efficient lighting, heating, and cooling systems. Additionally, some Minnesota businesses use solar panels on their roofs for an added clean technology to assist in their competitiveness and reduction in carbon. At Louis Industries in Paynesville, they have solar on the top of their large manufacturing building. A long-time industry leader in steel, Louis Industries has worked to reduce its electricity bill while increasing its manufacturing process. By adding the solar array, Louis says he can reduce his \$15,000 monthly electric bill by \$5,000 each month.<sup>68</sup> The efficiencies and investments are making businesses more competitive, especially when the bottom line matters for the sale of their products.

## INSIGHTS

### The Industry Plays a Significant Role in the State’s GDP

Currently 319,000 Minnesotans work in manufacturing, which accounts for 13 percent of private-sector jobs in the state. Fifteen percent of all wages paid in Minnesota come from manufacturing and manufacturing represents the single largest private sector component of Minnesota’s GDP totaling \$49.2 Billion or 16 percent of Minnesota’s total GDP in 2017.<sup>69</sup>

<sup>64</sup> “Sources of Greenhouse Gas Emissions.” *United States Environmental Protection Agency*, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>. Accessed Aug. 2022.

<sup>65</sup> Ewing, Jack and Ivan Penn. “Clean Energy Projects Surge After Climate Bill Passage.” *The New York Times*, Sep. 7, 2022, <https://www.nytimes.com/2022/09/07/business/energy-environment/clean-energy-climate-bill.html>. Accessed Sep. 2022.

<sup>66</sup> “Manufacturing in Minnesota.” *Enterprise Minnesota*, <https://www.enterpriseminnesota.org/manufacturing-in-minnesota/>. Accessed Aug. 2022.

<sup>67</sup> “4 MN Companies Among 100 Greenest in U.S.” *Twin Cities Business*, Nov. 4, 2011, <https://tcbmag.com/4-mn-companies-among-100-greenest-in-u-s/>. Accessed Sep. 2022.

<sup>68</sup> “Louis Industries.” *New Energy Equity*, <https://ips-solar.com/projects/louis-industries/>. Accessed Sep. 2022.

<sup>69</sup> “Manufacturing in Minnesota.”



Manufacturing Jobs are In-Demand, Many Require No Education Beyond High School

A recent presentation from DEED’s Labor Market Information office on Regional Manufacturing Labor Demand and Career Pathways, showed that current manufacturing job openings are numerous. When investigating the educational attainment of a variety of manufacturing jobs, 77 percent of manufacturing jobs did not require education beyond a high school diploma. Twenty-one percent of job openings had no educational requirement and 52 percent of the manufacturing openings required less than one year of experience.

Table 7 outlines some of these in-demand jobs (nationally) within the manufacturing industry alongside their respective annual salaries and education requirements. Many of the jobs listed in Table 7 align with those which play a significant role in industrial energy efficiency retrofits. These retrofits are carried out by skilled construction trades workers, predominantly those involved in energy systems installation, maintenance and operations including electricians, plumbers and pipefitters, and sheet metal workers, who are primarily responsible for electrical equipment including lighting and HVAC systems.<sup>70</sup>

TABLE 7: MANUFACTURING JOBS AND RELATED EDUCATION REQUIREMENTS AND AVERAGE WAGES<sup>71</sup>

Table with 3 columns: Job, Average annual salary in Central Minnesota, Education requirement. Rows include Maintenance and repair workers, Welders, First line supervisors of production and operators, Mixing and blending Machine setters, Industrial Engineer, and Machinist.

In-Demand “New Collar” Manufacturing Jobs are Transforming Energy Efficiency

In addition to those positions identified in Table 7, many of the jobs in manufacturing that allow for such transformation in energy efficiency are from technology. In manufacturing, significant nationwide workforce shortages exists and many of the jobs are technology-based. There is high demand for people with technological skills in areas such as engineering, IT, management systems and supply-chain careers and sustainability experts. In a conversation with the National Association of Manufacturers it was indicated that the term “new collar” is used in manufacturing to communicate the evolution in these technology-related manufacturing jobs. Table 8 outlines the job growth rate of the most in-demand manufacture jobs in this “new collar” technology sphere alongside their average hourly wages.

TABLE 8: MANUFACTURING SECTOR JOBS WITH HIGH JOB GROWTH<sup>72</sup>

Table with 3 columns: Job, Job growth rate, Average hourly wage. Rows include Business Impact Analyst, Industry Segment Futurist, Product Innovation Strategist, and Supply Chain Transparency Auditor.

70 Putting California on the High Road. California Workforce Development Board, Jun. 2020, https://cwdb.ca.gov/wp-content/uploads/sites/43/2020/09/AB-398-Report-Putting-California-on-the-High-Road-ADA-Final.pdf.

71 “Data Center.”

72 ibid



Of comparison, the jobs outlined in *Table 7* are made up of workers who are predominately white and male. In the jobs outlined in *Table 8* there is greater gender parity, however racial diversity is low with only 9 percent of workers identifying as Black, Indigenous, or people of color.

**Business Growth Opportunities Represent an Opportunity to Position Minnesota as a Strategic Leader**

The recently passed IRA will have a significant impact on manufacturing. BlueGreen Alliance notes “the act will have investments to cut industrial emissions and boost clean technology.”<sup>73</sup> It is expected that jobs and manufacturing growth will be witnessed in wind turbines, solar panels, electric vehicle batteries and other electric vehicle part production, and many other areas of clean technology. With the passing of the IRA, it is anticipated that there will be significant job growth related to the production of the making of key components of the sustainable technology and the final product. The IRA also includes a number of transformative tax incentives for solar energy products and manufacturing operations.<sup>74</sup>

Prior to the passing of the IRA, Minnesota businesses were already making sustainable vehicles and energy producing items. New Flyer, located in St. Cloud and Crookston, have been producing electric buses since 2017. The electric busses have zero carbon emissions and 100 to 160 tons of GHG per year are reduced with each bus.<sup>75</sup> The electric busses have also a hidden benefit of not having to purchase petroleum. This leads to significant savings and GHG reductions with the busses located in 80 cities in six counties.



Electric recreational vehicles, including snowmobiles and side-by-sides, are being designed and produced in Minnesota by Polaris. The new RANGER XP Kineti manufactured by Polaris, a four-wheel side-by-side, is considered the most powerful UTV on the market, gas or electric.<sup>76</sup>

Many of the items in our everyday lives that help us to be more efficient, such as the windows in our homes, are made in Minnesota. Andersen Windows is producing windows that are listed in the top five most energy efficient windows by [thehousedesigners.com](http://thehousedesigners.com). The windows with EcoExcel are 70 percent more energy-efficient in the summer and

45 percent more energy-efficient in the winter compared to standard dual pane glass. Andersen has also invested other environmental areas such as solar and steam plants to run their Bayport facility, including the use of thermal power, pollinator gardens, reduction, reuse, and recycling of materials.<sup>77</sup> Heliene, in Mountain Iron, produces solar panels. They produce a variety of solar panels employing more than 60 people. With their recent expansion, they will be the second-largest solar module manufacturing plant in the U.S. according to Renewable Energy World.

<sup>73</sup> Blue Green Alliance. Blue Green Alliance Foundation, <https://www.bluegreenalliance.org/>. Accessed Aug. 2022.  
<sup>74</sup> “The IRA: What’s in it for Manufacturers?” Hogan Lovells International LLP, Aug. 15, 2022, <https://www.engage.hoganlovells.com/knowledgeservices/news/the-ira-whats-in-it-for-manufacturers/>. Accessed Jul. 2022.  
<sup>75</sup> New Flyer: North America’s Bus Leader. *New Flyer*, <https://www.newflyer.com/>. Accessed Sep. 2022.  
<sup>76</sup> “Ranger XP Kineti: The Power to do More.” Polaris, <https://www.polaris.com/en-us/off-road/ranger/models/ranger-xp-kinetic/>. Accessed Sep. 2022.  
<sup>77</sup> *Anderson Windows and Doors*, <https://www.andersenwindows.com/>. Accessed Sep. 2022.



## RECOMMENDATIONS

Taking into consideration the above industry insights, the following recommendations are intended to ensure business growth, high wages, and equitable access to jobs in the future of the Minnesota's manufacturing industry.

### **Promote Opportunities within the IRA to Manufacturers**

Many of the transportation indicatives in the IRA come from electric car, busses, and truck production. Minnesota should invest ensuring information about how to capitalize on the IRA is making it to the manufactures of those items and their components.



### **Attract and Grow Electric Vehicle Supply-Chain Businesses**

With manufacturing of electric vehicles, many parts to those vehicles are needed. States surrounding Minnesota build components to electric vehicles and Minnesota should work to also lure supply-chain businesses to the state as recommended by the Blue Green Alliance. They note, "Recent announcements reveal "mega" trends in electric vehicle and battery manufacturing expansions." Minnesota has an opportunity to be a leader in attracting and growing businesses that supply to large electric vehicle manufactures.

### **Strengthen Technology and Robotics in the K-12 System**

Robotics is a way to introduce youth to manufacturing. Robotics allows people of all backgrounds to participate in coding, building, driving, troubleshooting of technology. When kids are introduced at a young age, they are more likely to look at these careers as opportunities. Moreover, Minnesota can use these efforts to expose children of all backgrounds to technology and robotics promote more diversity in the industry.

### **Offer and Support the Minnesota Tour of Manufacturing**

Central Minnesota Manufacturers Association (CMMA) and many other groups promote tours of manufacturing facilities to bring youth, their parents, legislators, and others to witness manufacturing firsthand to remove the reputation of the manufacturing sector as dirty, dingy, or unsafe, all of which are not true. The tour allows youth and the people that influence them to see the opportunities within manufacturing for their career path. Traditionally, manufacturing has deep roots in welcoming immigrants and a diverse make up of workers. However, Minnesota has very limited diversity in the manufacturing sector and the Tour of Manufacturing is one way to attract a more diverse workforce.

### **Address Common Workforce Barriers: Childcare and Driver's Licenses**

Some challenges identified by stakeholders by this MBVC working group are those that impact many sectors, includes the need for safe, reliable, affordable childcare and access to driver's licenses. An effective and well-rounded State effort to diversify the industry's workforce will need to address these barriers.

### **Educate Manufacturers on how to Connect with and Retain more Diverse Workers**

DEED addresses some of this through their I-WE program, but efforts like these need to expand and evolve to include greater connections with the manufacturing sector. At a time when the industry is growing and changing, connections, collaborations, and education should be prioritized to improve the industry's efforts to reach, train, hire, and retain a workforce that includes traditionally underrepresented groups.



## SUSTAINABLE AVIATION FUELS

*An Opportunity to Grow the Rural Economy: Leading the Biofuel Transformation*

Minnesota has long been known as a leader in ethanol and biodiesel production and Minnesota could become a leader in the next biofuels transformation: Sustainable Aviation Fuels (SAF). The development of a thriving SAF market and industry in Minnesota exists at the nexus of agriculture, forestry, and transportation sectors working towards sustainability and climate goals. Minnesota is well positioned to be a part of the global transition to SAF by building upon existing biofuels infrastructure and investment, significant agricultural and forestry biomass sources, private-public partnerships developing new low carbon feedstocks, and aviation companies seeking homegrown jet fuel. The emerging and rapidly growing SAF industry presents an unprecedented opportunity for Minnesota to expand biofuel production, create jobs with family sustaining wages, support farmers and our rural economy, and reduce GHG emissions from the notoriously difficult to decarbonize transportation sector.



### INSIGHTS

#### SAF Workforce and Labor Data is Lacking

The advanced biofuels industry employs workers in a variety of occupations. For example, occupations in advanced biofuels and SAF production include chemists, engineers, chemical and laboratory technicians, electricians, plant managers and operators, farmers, ranchers and agricultural managers, and industrial machinery mechanics. However, National and state level labor data for the agricultural sector, including the Bureau of Labor Statistics, does not provide adequate subsector information on agricultural jobs relating to sustainable and resilient economic opportunities nor data specific to the biofuels or SAF industry. While many jobs in these sectors pay family sustaining wages in Minnesota, specific data on projected growth and demographics is also lacking as agriculture related jobs do not have employers reporting into the unemployment insurance system as in other sectors.

Despite this lack of information, the MBVC sprint working group members utilized their collective expertise and knowledge of agricultural commodity markets and biobased products to identify emerging economic opportunities for Minnesota's agricultural sector.

#### SAF Production is Linked to Significant Economic Benefits

In February 2021, the San Francisco International Airport (SFO) released a report on SAF business development impact and opportunities through interviews with producers a part of SFO's Stakeholder Working Group.<sup>78</sup> The report included case study analysis on SAF Production Facilities in California and under construction outside the state. Information on the following three facilities provide insights into the economic benefit potential of SAF as Minnesota begins to develop and prioritize programs and policies designed to capitalize on the burgeoning SAF industry.

#### World Energy Paramount Plant

World Energy is converting its Paramount, California petroleum refinery to produce sustainable aviation fuels. Capacity is expected to be 350 million gallons per year and the project is expected to be completed in 2023.

- \$15.2 billion impact on US economy (\$7.76 billion in CA) between 2019-2024
- Over 16,300 jobs in the US (nearly 5,800 in CA)
- \$1.3 billion direct capital investment (\$620 million in CA)

<sup>78</sup> *Sustainable Aviation Fuel Accelerator: Economic Development Models for California, 2021*. San Francisco International Airport (SFO) Working Group, Feb. 2021, [https://fuelandcarbonlaw.com/s/Feb-2021-Accelerating-SAF-in-CA\\_-Economic-Development-Opportunities.pdf](https://fuelandcarbonlaw.com/s/Feb-2021-Accelerating-SAF-in-CA_-Economic-Development-Opportunities.pdf).



## Fulcrum Sierra Biofuels Plant

The plant located in Storey County, NV, will process approximately 175,000 tons of municipal solid waste feedstock annually, creating 11 million gallons per year of renewable synthetic crude oil, or “syncrude,” that will be processed by Marathon Petroleum into transportation fuel in early 2021.

- State support: sales tax abatement, modified business tax abatement, personal property, tax abatement, real property tax abatement: value \$1,909,038
- Investment capital: \$280M for 65,000 square foot feedstock-processing facility
- Total jobs supported: 59; Construction: 134
- Local/state tax revenue (direct + indirect): \$2,71,926

## Significant Expansion of SAF Production is Necessary to Meet the Industry’s Decarbonization Goals

SAFs are advanced biofuels produced from renewable sources such as corn grain, oil seeds, algae, waste fats, greases and oils, forestry residues and wood wastes, municipal solid waste, and dedicated energy crops. The International Civil Aviation Organization (ICAO) defines SAF as alternative aviation fuels that “i) achieve net GHG emissions reduction on a life cycle basis; ii) respect the areas of high importance for biodiversity, conservation, and benefits for people from ecosystems, in accordance with international and national regulations, and iii) contribute to local social and economic development, and competition with food and water should be avoided.”<sup>79</sup>

The global aviation industry is racing to lower GHG footprints and decarbonize air travel through use of SAF. Aviation emissions make up nine percent to 12 percent of total U.S. transportation sector emissions<sup>80</sup> and transitioning to low carbon fuels is a critical step to reducing emissions. SAFs are considered a “drop in” fuel meaning that SAF can be used in existing jet engines without requiring modifications to the engine systems. A low carbon drop in fuel is crucial to the aviation industry’s efforts to decarbonize because airplanes operate in fleets for decades and modifications pose financial barriers. The global jet fuel demand is estimated to be 230 billion gallons in 2050, and the global aviation sectors aim to reduce GHG emissions by 50 percent by 2050 compared to a 2005 baseline.<sup>81</sup> In 2020 only 4.5 million gallons of SAF were produced in the United States<sup>82</sup> and exponential growth in SAF is needed to meet the aviation industry’s goals and commitments.

In recognition of the need to significantly expand production, the federal government launched the Sustainable Aviation Fuel Grand Challenge to scale up new technologies to produce sustainable aviation fuels on a commercial scale. The grand challenge is a partnership with the U.S. Department of Energy, Department of Transportation, and Department of Agriculture and is designed to reduce the cost of SAF, enhance sustainability, and expand production to meet the ambitious goal of producing 35 billion gallons by 2050.

<sup>79</sup> Sustainable Aviation Fuel (SAF).” *International Civil Aviation Organization (ICAO)*, <https://www.icao.int/environmental-protection/pages/SAF.aspx>. Accessed Sep. 2022.

<sup>80</sup> “Sustainable Aviation Fuels.” U.S. Department of Energy Office of Energy Efficiency & Renewable Energy, <https://www.energy.gov/eere/bioenergy/sustainable-aviation-fuels>. Accessed Sep. 2022.

<sup>81</sup> *Sustainable Aviation Fuels: Review of Technical Pathways*. U.S. Department of Energy Office of Energy Efficiency & Renewable Energy, Bioenergy Technologies Office, 2020, <https://www.energy.gov/sites/prod/files/2020/09/f78/beto-sust-aviation-fuel-sep-2020.pdf>.

<sup>82</sup> *Fact Sheet: Biden Administration Advances the Future of Sustainable Aviation Fuels in American Aviation*. The White House, Sep. 9, 2021, <https://www.whitehouse.gov/briefing-room/statements-releases/2021/09/09/fact-sheet-biden-administration-advances-the-future-of-sustainable-fuels-in-american-aviation/>.





## Minnesota is Uniquely Poised to Grow, Make, and Produce SAF in the State

Minnesota is already a leader in promoting biofuels production and use; it was the first state to mandate ethanol and biodiesel in its fuel supply and has adopted statutory goals for replacing petroleum with biofuels. Minnesota has the potential to leverage the aviation industry's SAF transition in a way that creates good paying jobs, revitalizes rural communities, and supports the state's agriculture and forestry sectors. Strengths that can be capitalized on include:



- Minnesota has many key attributes that are desirable to industry when evaluating where to invest in SAF production: exceptional agricultural productivity and biomass availability, existing biofuel refineries and transportation infrastructure, and demand from the Minneapolis Saint Paul International airport
- The aviation industry is committed to using SAF to reduce carbon emissions and major airlines, including Delta, are looking for opportunities to grow, produce, and use SAF in Minnesota
- There are multiple technologically feasible pathways for SAF production in Minnesota from different renewable feedstocks. The pathways that are most commercially advanced are the "alcohol to jet" pathway and the "HEFA" (hydrotreated esters and fatty acids) pathway. The alcohol to jet pathways uses ethanol or butanol as feedstocks, and HEFA uses refined or waste vegetable oils.
- In Minnesota in the near-term, a SAF production facility would be co-located or near an existing ethanol facility or a renewable diesel facility. Minnesota does not currently have a SAF production facility in operation, however an upgraded ethanol plant in Luverne is producing a low-carbon SAF biointermediate (chemical precursor).<sup>83</sup>
- Minnesota has an Advanced Biofuel Production Incentive Program and facilities producing SAF are eligible for a production incentive for up to 10 years. (Note: This program is scheduled to sunset in 2025).<sup>84</sup>

## RECOMMENDATIONS

As a part of this MBVC sprint, the workgroup convened state and national stakeholders from the transportation, agriculture and environmental sectors and facilitated a conversation around the following theme: "What steps does Minnesota need to take in order to capitalize on the opportunity to grow, make, and produce SAF in the state?". Recommendations from the convening are grouped by topic area below.

### Catalogue Existing State Infrastructure, Assess Feedstock and Producer Potential, and Identify Gaps

Minnesota should prioritize as a short-term benchmark of success (12-18 months) to identify funding or request funding from the legislature and develop and execute:

- A feasibility study on specific feedstocks and potential producers, including co-processing studies with existing ethanol plants or petroleum refineries.
- A high level study of existing infrastructure and infrastructure needs to blend and certify SAF blends for MSP and regional airports.

### Expand State Policy and Business Support

**Establish a Suite of Minnesota policies supporting SAF production.** Many stakeholders noted that this is a crucial step because the Minnesota-based SAF industry's ability to successfully compete is dependent on State policy and incentives that complement the federal blenders tax credit for SAF. Identified priority policies include:

- Support State policies that close the price gap between traditional jet fuel and SAF and that complement the federal blenders tax credit.

<sup>83</sup> St. Anthony, Neal. *Despite Bumps, Plant-Based Aviation Fuels Maker Gevo Continues its Stock Flight*. StarTribune, Jun. 9, 2022, <https://www.startribune.com/despite-bumps-plant-based-aviation-fuels-maker-gevo-continues-its-stock-flight/600180642/>.

<sup>84</sup> Minnesota Statutes 2022, Section 41A.16, <https://www.revisor.mn.gov/statutes/cite/41A.16>.



- Develop state-level novel financing strategies to attract investment in Minnesota: SAF tax incentives and abatements, grants, SAF production incentives, biomass subsidies, venture capital programs, etc.
- Fully fund the existing Advanced Biofuel Production Incentive Program that provides advanced biofuel production incentives and extend sunset date beyond 2025.
- Establish a customized pathway to streamline and expedite permitting for SAF projects.

**Pass a Minnesota Low Carbon Fuel Standard (LCFS).** Many stakeholders stated the important of an LCFS, as a LCFS would provide market incentives for SAF production and use in Minnesota and make the state’s industry more competitive.

**Establish Minnesota SAF goal via executive order.** This show of interest from the Governor and Department of Agriculture Commissioner in addition to State policies gives investors confidence in supporting the industry.

**Progress towards a Minnesota Clean Fuel Standard.** SAF incentives such as this should be prioritized in the legislature and will assist help solidify a State-image that is dedicated to long-term support of the industry.

### **Establish a SAF Taskforce**

Goals and outcomes of a SAF taskforce would include defining feasible approaches to SAF production, a thorough evaluation of workforce needs and barriers, the mapping of various supply chain scenarios and opportunities, identifying financing, and the development of new low carbon crops for feedstocks.

### **Promote Minnesota’s Existing SAF Competitive Advantages**

Minnesota has significant agricultural and forestry feedstock potential, expansive existing biofuels infrastructure, existing state production incentives, and is already a research and innovation hub. The State should prioritize the promotion of this information to SAF producers and investors; these competitive advantages will speak for themselves in making the business case to those looking for locations to expand the burgeoning SAF industry into.





## TRANSPORTATION SECTOR

*Key to Achieving a Healthy Environment: Exploring Emerging Markets*

The transportation industry is critical to achieving a high quality of life, a competitive economy, and a healthy environment for Minnesota. While a comprehensive and integrated transportation system provides for easy movement of goods and access to opportunities, the transportation sector is the largest contributor to GHG emissions in the U.S., estimated to account for 27 percent of all GHG emissions in 2020.<sup>85,86</sup> The transportation industry is focusing on incorporating sustainable practices into business models to increase efficiency, reduce operating costs, and minimize negative impacts to the environment.



The transportation sector represents a significant employment base in the U.S. with an estimated 13.3 million workers employed in transportation-related industries in 2021, which makes up 9.1 percent of all workers.<sup>87</sup> Transportation sector jobs tend to be well paid and relatively stable. Current employment is disproportionately white and male, though efforts to diversify the workforce by focusing on recruitment and training for women and people of color are increasing. The transportation sector, especially in the areas of construction and vehicle operators and drivers, is experiencing significant workforce shortages while the industry is simultaneously adopting new technology and innovations focused on sustainability. This situation does present challenges, but it also presents opportunities such as exploring new emerging markets for Minnesota, investing in workforce training focused on incorporating sustainability into existing jobs, and recruiting women and people of color into the transportation workforce.

Leading on lower carbon transportation products and services can give Minnesota a competitive advantage to grow Minnesota jobs, reduce historic and structural inequities, and help There are clear opportunities to explore emerging markets and position Minnesota as a leader in the transportation sector.

### INSIGHTS

#### **Electrifying Medium and Heavy Duty (MHD) Vehicles will Require Significant Coordination**

According to the Minnesota Sustainable Transportation Council, medium- and heavy-duty (MHD) vehicles make up five percent of vehicles on the road, but 24 percent of U.S. transportation emissions.<sup>88</sup> Supporting transformation in this market is imperative to deliver reduced emissions of GHG that accelerate climate change. MHD transportation electrification requires significant coordination – including eventual planning, logistics, data collection, and infrastructure development, as all are important components to increased electrification in this sector.

<sup>85</sup> “TET 2018 – Chapter 4 – Transportation Employment.” *U.S. Department of Transportation: Bureau of Transportation Statistics*, 2021, <https://www.bts.gov/transportation-economic-trends/tet-2018-chapter-4-employment>. Accessed Sep. 2022.

<sup>86</sup> “How Uber Freight’s Bundles Feature is Reducing Trucking Emissions.” *Taking Shipping Logistics in a New Direction*, Uber Freight, Oct. 8, 2022, <https://www.uber.com/en-US/blog/uber-freight-load-bundles-reduce-emissions>. Accessed Aug. 2022.

<sup>87</sup> “TET 2018”

<sup>88</sup> “Sustainable Transportation Advisory Council.” *MN Department of Transportation: Office of Sustainability and Public Health*, <https://www.dot.state.mn.us/sustainability/advisory-council.html>. Accessed Aug. 2022.



## National and Global Markets for Electric Buses are Expanding

Electric buses benefit communities throughout Minnesota by reducing emissions, improving air quality, and creating jobs. This is an emerging clean and resilient sector where Minnesota is well positioned to capitalize on the opportunity due to the presence of Minnesota-based manufacturers, GHG emission goals, and new opportunities for federal funding. There is also an opportunity to increase sustainability and resilience in existing jobs in the areas of vehicle manufacturing, bus drivers, and electric bus vehicle maintenance workers.

According to PS Market Research, the global electric bus market registered 82,604-unit sales in 2020, and it is expected to grow at an annual growth rate of 14.9 percent from 2021–2026.<sup>89</sup> The key factors responsible for the growth of the market include the rising environmental concerns due to GHG emissions, declining cost and improving operational efficiency of batteries, and long-term cost benefits of electric buses. Minnesota’s public transit agencies are moving towards transitioning fleets to zero emissions and are leveraging federal grants to purchase and deploy new electric vehicles. In 2021, the Minnesota legislature directed Metro Transit to create a bus electrification plan. The Zero Emission Bus Transition Plan, sets a near-term goal of ensuring at least 20 percent of its 40-foot replacement bus purchases are electric for the next five years, starting in 2022.<sup>90</sup> Also, in 2021, Congress passed the Bipartisan Infrastructure Law which included \$7.5 billion for electric buses and MnDOT recently submitted a grant application for electric buses for use by greater MN transit agencies.<sup>91</sup>

With the expanding national and global market for electric bus vehicles, Minnesota may be positioned well to grow the existing electric transit vehicle manufacturing sector. Minnesota is home to two electric transit vehicle manufacturers – New Flyer and Zeus. New Flyer is considered one of the three top national electric transit vehicle manufacturers with plans for continued expansion into the marketplace. New Flyer manufactures heavy duty buses in Canada and the United States, offering a very broad product line in the industry, including drive systems powered by clean diesel, liquefied natural gas (LNG), compressed natural gas (CNG), electric trolley as well as energy-efficient diesel-electric hybrid vehicles.<sup>92</sup>

## Demand for Transportation Construction Jobs is Increasing While Facing a Growing Shortage

Construction jobs, including transportation infrastructure projects, are a driver of job growth and an indicator of a strong economy. At the same time, while the labor market overall is increasingly becoming more diverse, the transportation and associated construction jobs continue to struggle to diversify their workforce; as of 2019, the construction workforce was 87.6 percent male.<sup>93</sup>

The industry is also facing a growing workforce shortage. In 2019, DEED was already reporting that construction jobs were projected to grow by 8.9 percent by 2026.<sup>94</sup> The passage of the Bipartisan Infrastructure Law (IIJA) and IRA has significantly increased transportation-related construction opportunities for Minnesota which is expected to bolster construction job growth projections. The expected growth in the industry and needs for additional workers present an opportunity for Minnesota to prioritize diversifying the existing and future workforce.



<sup>89</sup> “Electric Bus Market to Register 912,354 Unit Sales by 2030.” *Prescient & Strategic Intelligence*, Jan. 2023, <https://www.psmarketresearch.com/press-release/electric-bus-market>. Accessed Jan. 2023.

<sup>90</sup> “Electric Buses.” *Metro Transit*, <https://www.metrotransit.org/electric-buses>. Accessed Sep. 2022.

<sup>91</sup> “Building a Better America.” *The White House*, <https://www.whitehouse.gov/bipartisan-infrastructure-law/>. Accessed Aug. 2022.

<sup>92</sup> New Flyer

<sup>93</sup> Chaudhuri, Sanjukta. “Snapshot: Minnesota’s Construction Industry.” *Minnesota Department of Employment and Economic Development*, Sep. 2019, <https://mn.gov/deed/newscenter/publications/trends/september-2019/construction-industry.jsp>.

<sup>94</sup> *ibid*



While average hourly wages in construction were far above average at \$33.99,<sup>95</sup> a study commissioned by the Local Road Research Board (LRRB) to investigate the growing workforce shortage in Minnesota’s transportation industry and address Minnesota’s transportation workforce issues identified seeking more pay as the top reason transportation workers leave jobs. The LRRB study also strove to identify the possible causes and determine strategies to improve how agencies across the state find and keep workers.<sup>96</sup>

## Driver and Vehicle Operators are Aging and Lacking Diversity

Driver shortages are exacerbating supply chain issues and affecting the ability for travel for school, work, medical appointments, and other activities. According to the Minnesota Trucking Association, in 2022, the number of certified drivers in Minnesota declined by a record 5,285 drivers and nationwide by over 80,000; this downward trend is expected to continue.<sup>97</sup> There are many reasons for the current driver shortage, but one of the largest factors is the relatively high average age of the existing workforce. According to surveys by American Trucking Association (ATA), the average driver age is 46.<sup>98</sup>

Additionally, the industry has historically struggled to attract all segments of the population as just 6.6 percent of truck drivers in 2018 were women.<sup>99</sup> This percentage hasn’t changed much historically, ranging from 4.5 percent to 6.6 percent over the last 18 years. In 2018, 40.4 percent of drivers were minorities, which has jumped 13.8 percentage points from 26.6 percent in 2001.<sup>100</sup>

Attempts to increase the industry’s workforce have prioritized providing opportunities to a wider range of people. For example, a driver must be 18 years old to qualify for a commercial driver’s license, though licensed truck drivers must be at least 21 years old to drive freight across state lines.<sup>101</sup> To open up a career pathways for trucking, especially for women and teenagers, a new federal pilot program will let 18- to 20-year-olds drive rigs across state lines. Currently, truckers who cross state lines must be at least 21. And the trucks must have front-facing video cameras, an automatic transmission and electronic braking, with speeds governed at 65. The new program is an apprenticeship that has 400 hours of training, including behind the wheel with an experienced driver. The program will run for up to three years, and the motor carrier agency must turn in a report to Congress analyzing the safety record of the teen drivers and making a recommendation on whether the younger drivers are as safe as those 21 or older.



<sup>95</sup> *ibid*

<sup>96</sup> “What’s Behind the Transportation Workforce Shortage—and What Should Public Agencies do About it?” University of Minnesota Center for Transportation Studies, Jul. 20, 2021, <https://www.cts.umn.edu/news/2021/july/workforce>.

<sup>97</sup> The Minnesota Trucking Association, <https://mta.site-ym.com>. Accessed Sep. 2022.

<sup>98</sup> Costello, Bob and Alan Karickhoff. Truck Driver Shortage Analysis 2019. American Trucking Association, Jul. 2019, <https://www.trucking.org/sites/default/files/2020-01/ATAs%20Driver%20Shortage%20Report%202019%20with%20cover.pdf>.

<sup>99</sup> Krisher, Tom. Federal Regulators Look to Lower Age Requirement for Semi Truck Drivers with New Program. Kare11, Jan. 2022, <https://www.kare11.com/article/news/nation-world/teen-drivers-semi-trucks/507-3bf54b81-e83d-4dac-9feb-d7b4d0d78a76>.

<sup>100</sup> “A Return to Rapid Clean Energy Job Growth in Minnesota.” Clean Jobs Midwest, 2022, <https://www.cleanjobsmidwest.com/state/minnesota>. Accessed Sep. 2022.

<sup>101</sup> *Lower Age Requirement*, 2022.



## RECOMMENDATIONS

### Explore Opportunities in Partnership with Electric Bus Manufacturers

Hosting regular and ongoing conversations with electric bus manufacturers and other key stakeholders will help the State and State agencies identify and explore opportunities for market expansion as well as address barriers. These conversations will also inform and guide pursuits of funding opportunities for conversion of public transit and other vehicles to zero-emissions.

### Train the Future and Existing Workforce in the Industry's Evolving Skillsets and Benefits

Minnesota's transportation industry is experiencing workforce shortages due to an aging workforce coupled with a declining pipeline of workers. The benefits of working at Minnesota's public transportation agencies must be effectively conveyed and promoted to all hiring managers so they can be relayed to applicants.

While the industry is experiencing these worker shortages, it is also adopting new and innovative business practices focusing on sustainability, which at times requires workers to have new skillsets. Training the future workforce and retraining the existing workforce in these new skillsets should be prioritized. For example, drivers are being trained or retrained to operate electric vehicles, construction workers are being trained or retrained to use sustainable building materials, and state departments of transportation are piloting installations of solar panels and pollinator habitats along roadways.

### Increase Awareness of Transportation Careers

A strategic marketing strategy should be developed to maximize younger people, particularly diverse populations, to careers in the transportation industry. The strategy should aim to reach and excite students about transportation-related employment options early in their education. Efforts should include:

- **Continued and expansion of STEM in schools.** These efforts should highlight the visibility of transportation careers and should be especially focused on women and minorities.
- **Support the University of Minnesota's Transportation Career and Connected and Automated Vehicles (CAV) camps.** Minnesota should prioritize ongoing and continued support in promoting these camps for middle and high school students.
- **Expand Local Technical Assistance Program (LTAP) training.** Efforts should be made exploring this expansion to focus on sustainability.

### Reduce Common Workforce Barriers

- **Eliminate red tape in hiring.** When possible, allow for exceptions in hiring, compensation, and advancement practices. Protocols such as paperwork and budget requests that require a substantial time commitment or advanced planning can be barriers to filling positions quickly or in response to a critical need.
- **Offer mentorships.** Provide formal opportunities for employees to learn from each other, with the expectation that these could lead to job promotion.
- **Plan for succession and document workplace practices.** Ensure that retirements and other vacancies will be filled quickly. Relying on existing employees to absorb a departing co-worker's work can lead to burnout and resentment. Invest in knowledge management systems so that key information can be retained as employees retire.

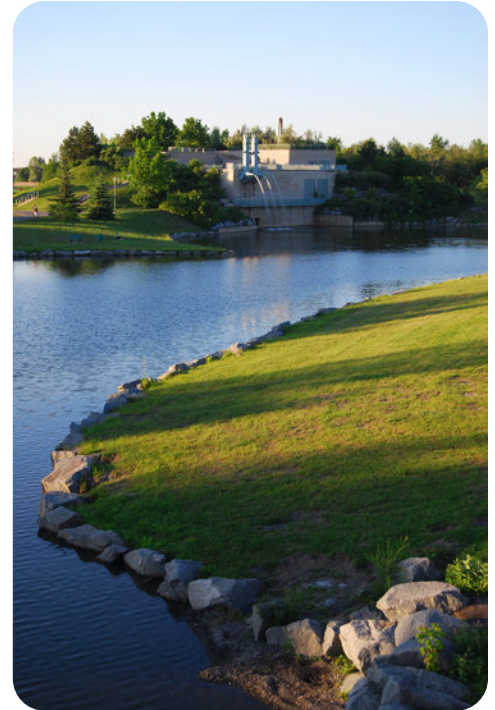


## WASTE AND WASTEWATER SECTORS

### *Cleaning Minnesota's Disposal Methods: Concomitant Jobs Primed for Growth*

The waste disposal sector currently accounts for around 1.2 percent of Minnesota's GHG emissions.<sup>102</sup> Clean and resilient jobs generally include those that support the diversion of wastes from more conventional methods of disposal, predominantly landfilling and, to a lesser extent, incineration, to cleaner methods such as recycling, composting, digesting, and reuse. Given the Minnesota Pollution Control Agency's (MPCA) unique obligations in wastewater regulation, and wastewater operation's existing workforce challenges, the MBVC sprint working group focused on wastewater operations as a clean and resilient job growth opportunity; waste and wastewater jobs beyond this scope represent a topic for future exploration. Wastewater operations include the jobs necessary for the routine performance of duties at a system or facility to achieve results that meet existing state laws and rules pertaining to water and wastewater, as defined under Minnesota law.<sup>103</sup>

To support and expand these cleaner methods of waste disposal and to grow concomitant clean jobs, recycling and organic waste processing infrastructure needs to be expanded. Reducing solid waste generation via the repair and reuse sector is not only good for Minnesota's environment and reducing our contribution to climate change, but also creates and sustains clean and resilient jobs in the state.



### Insights

#### **Despite Favorable Pay and Ease of Entry, Wastewater Operators are Declining**

In general, wastewater occupations provide family-sustaining wages and come with potential for advancement. In 2022, the median wage for an entry-level wastewater job offer was \$20.68, according to Minnesota's DEED Job Vacancy Survey.<sup>104</sup> Entry-level wastewater operators often can start with little to no experience and learn the trade on-the-job, though the Job Vacancy Survey shows 45 percent of all job postings for wastewater operators required one or more years of experience. The statewide job vacancy rate of 1.3 percent for wastewater operators is relatively low compared to the statewide job vacancy rate for all jobs of 7.9 percent. This suggests the demand for the trade may be low as a snapshot of time.

However, Minnesota is experiencing a decrease in wastewater operators choosing or continuing in the field. MPCA notes a large number of retirements in the past three years, though the exact numbers are not clear. Additionally, staff accounts for a decrease in Class D, C, and B operators who have tested up to higher class certification, according to MPCA's 2022 Training and Certification Systems (TACS) database. To some degree, operators are leaving the field. MPCA staff annually send out notice to operators whose certification is in danger of lapsing, and there has been an anecdotal increase in non-responses to those notices resulting in loss of the certificate. Based on this information, it is the perspective of the MPCA that more wastewater operators would afford greater permit compliance to local governments and would better protect the environment.

<sup>102</sup> "Climate Change Trends and Data." *Minnesota Pollution Control Agency*, <https://www.pca.state.mn.us/air/greenhouse-gas-emissions-data>. Accessed Aug. 2022.

<sup>103</sup> Minnesota Rules, part 9400.0100, subpart, 4b, <https://www.revisor.mn.gov/rules/9400.0100/>.

<sup>104</sup> "Job Vacancy Survey." *Minnesota Department of Employment and Economic Development*, <https://apps.deed.state.mn.us/lmi/jvs/Results.aspx>. Accessed Aug. 2022.

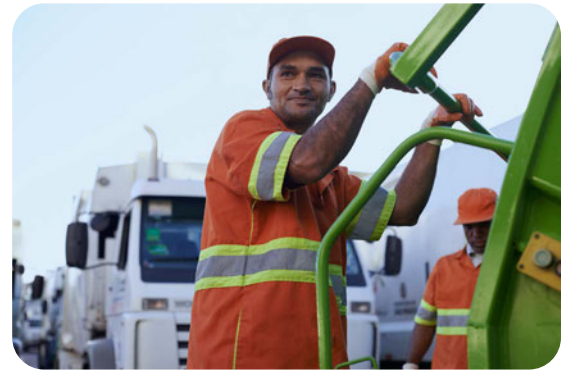


### Key Waste Sector Occupations are Primed for Growth

Based on review of labor market data from DEED, star industries tool as well as conversations stakeholder leaders from Minnesota’s waste sector and with subject matter experts within the MPCA, three key occupations within the waste sector that are prime for growth were identified:<sup>105</sup>

- Refuse and recyclable material collectors (SOC 53-7081)
- Heavy and tractor-trailer truck drivers (SOC 53-3032)
- Construction laborers (SOC 47-2061)

Each of these occupations is growing at both the state and national levels and all three provide family sustaining wages, with median hourly wages above \$23. It should be noted, however, that there is nothing inherently “clean” about any of these jobs. Rather, these are the key jobs to support Minnesota’s overall waste sector. They are the backbone of the three main components of waste disposal in Minnesota: waste collection, waste treatment and disposal, and waste remediation and management. Thus, ensuring that these jobs are contributing to sustainability is as much about expanding the workforce pool for these jobs as it is reshaping Minnesota’s waste sector from traditional disposal methods to the greener methods mentioned above. In addition to expanding the workforce pool, building, and expanding markets for recycled and composted materials is another way to create more clean and resilient jobs in the waste sector. Addressing both workforce and market development will ensure that many of the jobs in these three occupations are, in fact, contributing to a clean economy.



### Waste-Related Jobs Generally Provide Family-Sustaining Wages, But Lack Diversity

As noted above, the waste-related jobs of focus generally do provide family sustaining wages. The median hourly wages in each of these three occupations in Minnesota are well above the 2020 U.S. median hourly wage of \$16.36 and above the Minnesota median hourly wage of \$22.88.<sup>106</sup>

Wages earned by wastewater operators vary by licensure and years of experience. Job market data shows the tenth percentile making an hourly wage of \$29.70, 50th percentile making \$47.41, and 90th percentile making \$52.84. These figures will change regionally throughout the state, but all are non-exempt and are subject to overtime rates.

Labor market data and conversations with stakeholders show occupations identified are not representative of Minnesota’s diverse population and are predominantly male and white. Policies and actions that attract more women and Black, Indigenous, and people of color into technical and trade schools and thus feed the pipeline into these jobs is key.

### Workforce Training Challenges Dominate Industry Barriers

#### Trade and Technical School Qualification and Earned Years of Experience

The three waste-related occupations listed above generally do not require extensive education and training. Requirements for entry into these occupations are typically high school or less and typical on-the-job training is six months or less. Stakeholders shared that to support and grow jobs in Minnesota’s waste sector we need more people going into trade and technical schools which can fully qualify entrants into these occupations and generally involve a time commitment of two years or less. Many of the overarching recommendations for the MBVC Clean and Resilient Sprint working group would help address the workforce challenges in the waste and wastewater sector.

<sup>105</sup> “Explore Industry Specialization.” *Minnesota Department of Employment and Economic Development*, <https://mn.gov/deed/business/locating-minnesota/data/explore/>. Accessed Sep. 2022.

<sup>106</sup> “U.S. Bureau of Labor Statistics.” *U.S. Department of Labor*, <https://www.bls.gov/>. Accessed Aug. 2022.





The water and wastewater treatment sector comprises four classes of certification, each with varying degrees of skill and competencies. These range from Class D, as the lowest, increasing to Class A. The certification of each class corresponds to the technical classification of facility to be operated and is governed by State law.<sup>107</sup> Operators can advance in classification through earned years of experience, coupled with testing; *Table 9* depicts the details in the Operator Experience and Education Chart. A separate set of class-certification is also established for maintenance and operator of collection systems.



As of Summer 2022, MPCA’s TACS database had on record:

- 255 Class-A operators
- 317 Class-B operators
- 466 Class-C operators
- 901 Class-D operators

**TABLE 9: OPERATOR EXPERIENCE AND EDUCATION CHART<sup>108</sup>**

Class	Experience Requirements	Education Requirements
<b>A</b>	Class B certified operator at least two years Eight years operations experience in a Class A or Class B facility with two years management experience in a Class A or B facility	High school diploma or G.E.D.
	Class B certified operator at least two years Four years operations experience in a Class A or Class B facility with two years management experience in a Class A or B facility	B.S. degree in chemical, civil, environmental, mechanical, or sanitary engineering, or a physical or biological science
<b>B</b>	Class C certified operator at least one year Six years operations experience in a Class A, B, or C facility	High school diploma or G.E.D.
	Class C certified operator at least one year Two years operations experience in a Class A, B, or C facility	B.S. degree in chemical, civil, environmental, mechanical, or sanitary engineering, or a physical or biological science
<b>C</b>	Three years operations experience in a Class A, B, C, or D facility	High School Diploma or G.E.D.
	One year operations experience in a Class A, B, C, or D facility	B.S. degree in chemical, civil, environmental, mechanical, or sanitary engineering, or a physical or biological science
	One year operations experience in a Class A, B, C, or D facility	Satisfactorily complete and approved postsecondary program of courses in water and wastewater treatment technology**
<b>D</b>	One year operations experience in a Class A, B, C, or D facility	High School Diploma or G.E.D.
	Six months operations experience in a Class A, B, C, or D facility	B.S. degree in chemical, civil, environmental, mechanical, or sanitary engineering, or a physical or biological science
	No experience required	Satisfactorily complete and approved postsecondary program of courses in water and wastewater treatment technology**

\* The above also applies respectively to SA, SB, SC, and SD, except experience must have been gained in a wastewater facility or collection system

\*\*Approved program is available at St. Cloud Technical and Community College, and Vermilion Community College in Ely

<sup>107</sup> Minnesota Rules, part 9400.0700, <https://www.revisor.mn.gov/rules/9400.0700/>.

<sup>108</sup> “Wastewater Training and Certification.” *Minnesota Pollution Control Agency*, <https://www.pca.state.mn.us/water/wastewater-operators-training-and-certification>. Accessed Aug. 2022.



### Technology and Learning Formats

Resource constraints are a related, but separate barrier to the wastewater operator field. Online learning modules could prove an effective resource to operators and prospective operators. Drivers' education and hunter safety courses have flexible online alternatives for certification which could serve as models for wastewater operator treatment and certification. A concerted effort to promote talent development of this profession is necessary, and advancement in technology and learning formats could help accomplish that.

### Water and Wastewater Operators Training and Certification Board

Until 2019, Minnesota used a statutorily- authorized Advisory Council on Water Supply Systems and Wastewater Treatment Facilities. This advisory council, under statute, provided direction and feedback to Minnesota Department of Health (MDH) and MPCA on training and certification, making recommendations for study materials, required competencies, and continued learning.<sup>109</sup> The authorizing statute included a 2017 sunset provision, and MDH and MPCA have sought legislative reauthorization for several biennia without success. The purpose of the advisory council was to advise the commissioners of MPCA and MDH on:

1. Water supply system and wastewater treatment facility classification,
2. Operator qualification requirements, and
3. The laws, rules, and procedures that govern the operation of water supply facilities and wastewater treatment facilities.

The absence of the Water and Wastewater Operators Training and Certification Board has made changing and adapting learning modules to meet new needs more difficult as the formal direction of an oversight board to guide the development of such learning modules doesn't exist.

### Portability Continues to be a Workforce Market Challenge

Workforce market challenges and portability continue to be a barrier as well. MPCA staff have observed a "minor-league" effect in which an operator accepts a position in a small, sometimes rural city where he or she can operate under the license of another operator, gaining required hours and experience. When the required hours and experience are met, that operator can take the test to get a Class-D license, or the license one step higher than the current one. License and experience have value. A larger city, or regional center, will pay more than many small cities are capable of paying, thus the operator vacates the position with the small city in favor of the larger city, and often from that larger market to an even larger one, earning more in wages and opportunity with each advancement of certificate and class.

MPCA has heard from municipal leaders of small cities need help finding capable, licensed operators to fill open positions, but MPCA has little control over the mechanisms that would increase securing operators. It comes down to wage and opportunity for growth in the position. This will continue to be a challenge for small cities with Class-D wastewater facilities because wage and opportunity are often limited in smaller cities but increasing in larger cities.



<sup>109</sup> "Water Supply Systems and Wastewater Treatment Facilities Advisory Council." *Minnesota Department of Health*, <https://www.health.state.mn.us/communities/environment/water/wateroperator/advisorycouncil.html>. Accessed Sep. 2022.



## RECOMMENDATIONS

The recommendations outlined below seek to both expand jobs in Minnesota's waste sector and to make Minnesota's waste sector cleaner via diversion from more conventional disposal methods to methods such as recycling, composting/digestion, and reuse/repair.

### **Prioritize Workforce Growth to Meet Expanding Recycling, Composting, Reuse and Repair Infrastructure**

#### **Recycling**

Recycling tends to be more labor intensive than other waste disposal methods. Thus, the biggest limitation to expansion of recycling infrastructure is not having enough people to build and run recycling facilities and enough people, mostly drivers and collectors, to run the recycling system itself. In addition, to develop and run new infrastructure and machinery in the recycling industry, there is a need for electricians and plumbers for installation and maintenance of equipment. Incentives should also be explored to bring more people into the trades that support recycling. Structural supports for people going into trades could include paid tuition for 2-year or less technical schools. Equipment operators, welders, mechanics, truck drivers and general laborers that daily watch and run recycling machinery are also needed.

Policies to expand jobs in the recycling center fall under a couple main areas: expanding the workforce and driving the development and expansion of end markets. However, recommendations focus mainly on market development because many of the workforce challenges in the waste sector are addressed in other parts of this report.

#### **Composting**

Much of what applies to recycling also applies to diversion of organic wastes from landfills to composting and digesting facilities. The key needs are more workers, and more end use markets for composted materials. There is not enough capacity for all organic waste produced in Minnesota to make compost. Many of the jobs mentioned above for recycling are also needed to support and expand Minnesota's composting infrastructure. Specifically, more heavy equipment operators, heavy duty truck drivers, electricians, and general laborers are needed. Policies and actions to support and incentivize technical school enrollment is crucial. Additionally, marketing and sales jobs to sell the finished product and further developing education of the benefits of compost will support development of the composting industry in Minnesota.

#### **Reuse and Repair**

Reuse and repair is inherently different than recycling and composting to divert the waste disposal stream in that they instead seek to generate less waste to begin with. Nonetheless, Minnesota's reuse and repair sector can be a significant source of clean and resilient jobs. Reuse includes resale, rental, and repair of a diverse range of Minnesota products, including electronics, furnishings, clothing/textiles, and buildings. Labor shortages are an obstacle to expanding this sector and associated jobs. Jobs needed in the reuse sector not captured within the recycling and composting recommendations include designers and manufacturers.

A 2019 study of Minnesota's reuse sector found that statewide, the reuse economy generates about \$5.8 billion each year – \$1,035 per capita per year. The 10,631 reuse businesses make up seven percent of all statewide businesses. The reuse sector accounts for over 55,000 jobs in Minnesota, about one percent of overall employment in the state. The environmental benefits provided by Minnesota's reuse sector include avoidance of over 2.7 million metric tons of CO<sub>2</sub> equivalent GHG emissions per year.<sup>110</sup>



<sup>110</sup> *Impact Report: Environmental, Economic, and Social Impacts of Reuse in Minnesota*. Reuse Minnesota, Dec. 2022, <https://reusemn.org/impact-report>.

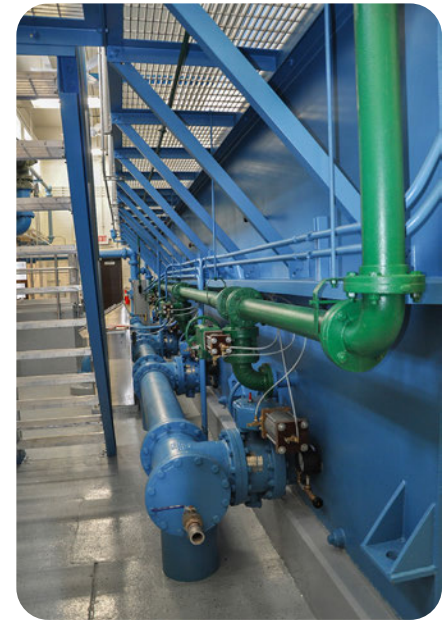


## Address Identified Wastewater Workforce Training Barriers

**Continue to provide alternative pipelines to the profession through alternative licensure pathways.** Minnesota can promote a provision in Minnesota Rule 9400.0700 that allows a person possessing a bachelor's degree from an accredited institution in chemical, civil, environmental, mechanical, or sanitary engineering or in a physical or biological science, and submit satisfactory evidence of at least one year experience in the operation of a Class A, B, C, or D system or facility, or similar industrial facility.<sup>111</sup> Making this provision more widely known could increase the entry-level participation from other fields.

**Continue offering conditional certifications where it makes sense.** Over the COVID-19 pandemic, MPCA worked with a municipality with a Class-A wastewater treatment facility to allow their Class-B operator to oversee operate the Class-A facility after a former Class-A operator retired. The Class-B operator was given conditional certification to operate a facility outside their scope of operation until such time that they could take the Class-A certification exam the following spring. This is an example of a flexible solution, and there were no losers, everyone wins.

**Reinstate the Advisory Council.** Amending M.S. § 115.741 to reauthorize the Advisory Council on Water Supply Systems and Wastewater Treatment Facilities would provide a foundation on which other recommendations could be made. This stakeholder group would be best equipped to make recommendations to MPCA and MDH on issues known in the field of wastewater operation, but not well understood elsewhere.



## Build more Local and Sustainable End Use Markets for Recycling and Food Waste Digest

Increasing diversion of waste in Minnesota from landfills and incinerators to recycling will require expansion of recycling infrastructure as well as development and expansion of end markets for recycled materials. An example of expanding end-use markets for recycled materials is the recently enacted Minnesota Natural Gas Innovation Act (NGIA) which created end markets for made-in Minnesota renewable natural gas.<sup>112</sup> The NGIA is a cogent example of a policy driver to incentivize the use of composted materials and anaerobic digestion to develop energy from organic materials in the form of renewable natural gas.

PET (polyethylene terephthalate) is a key example of a closed loop circular economy. It is the only plastic which can be 100 percent recycled in closed loop, bottle-to-bottle recycling, and thus the complete opposite of disposable 'single-use' plastics. Building more local markets for PET bottles and other recycled materials will require financial backing and education to develop demand.

Some of the policies to support infrastructure and end use market development in the industry could include the below list. Of note, the recently passed IRA provides funding and opportunity to do much of the following recommendations.<sup>113</sup>

**Increase Capital Assistance Program grants.** The Capital Assistance Program (CAP) helps local governments expand their recycling initiatives and finance the cost of building recycling infrastructure. Current State statute limits the amount of a CAP grant to \$2 million per county per project and has not increased since 1985. Increasing the limit for CAP grants per project will expand local infrastructure for waste reduction, reuse, recycling, and composting.

<sup>111</sup> Minnesota Rules, part 9400.0700

<sup>112</sup> "The Minnesota Public Utilities Commission Moves Forward Implementing the Natural Gas Innovation Act." *The Minnesota Public Utilities Commission*, May 5, 2022, <https://content.govdelivery.com/accounts/MNPUBUC/bulletins/3167ec0>.

<sup>113</sup> *The Inflation Reduction Act for Minnesota*, 2022.



**Increase funding to support existing, successful waste prevention, reuse, recycling, and composting initiatives, and supplement them with new programs.** Additional funds for facility development will help Minnesota take the next leap <https://www.whitehouse.gov/wp-content/uploads/2022/08/Minnesota.pdf> in developing and building recycling infrastructure.

**Increase residential recycling and organic waste pickup from bi-weekly to weekly.** The primary obstacle to this is not having enough drivers. Actions to increase the workforce of drivers such as support for technical schools could help to enable a shift to weekly recycling collection. As with recycling, the primary obstacle to increasing the frequency of organic waste pickup is not having enough drivers.

### **Support Existing and New Waste Prevention, Reuse, Recycling, and Composting Initiatives**

Fund compost and anaerobic digestion facility development and expansion grants. Past MPCA funding proposals have included funding for compost and anaerobic digestion facility development and expansion grants. funding for prevention of wasted food and food rescue grants.

Utilize food rescue grants. Food rescue grants are another funding mechanism that has been used in past MPCA funding proposals. These grants could be used to support partnerships with local food banks and/or refrigerated trucks for rescuing foods, which are both necessary for increased food rescue in Minnesota.

Fund source reduction efforts across multiple sectors. Funding efforts across multiple sectors simultaneously will help push efforts upstream.

### **Support Education About Organic Waste and Composting**

Additional training and education for organics and compost facility operators is needed. Expanding continuing education programs at the University of Minnesota for training compost facility operators represents one such opportunity.<sup>114</sup>

### **Pass Right to Repair Legislation in Minnesota**

This legislation would require manufacturers to provide consumers and independent repair businesses with fair access to service information and affordable replacement parts, tools, manuals, software, and firmware and would help reduce obsolescence of products used in Minnesota.

### **Require Building Material Management Plans and Develop Deconstruction Ordinances**

In addition to construction, there is clean and resilient job potential in deconstruction, which supports both recycling and reuse of construction materials. As part of building projects, Minnesota could require the tracking and sustainable management of materials, including options for deconstruction ordinances that require certain buildings be deconstructed instead of demolished to extend the life of existing, valuable materials.

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<sup>114</sup> Minnesota Statutes 2022, chapter 115A, <https://www.revisor.mn.gov/statutes/cite/115A>.

## **APPENDIX A:**

### ***Robust Existing Public Workforce Development and Education System***

Minnesota trains, supports, and otherwise prepares thousands of individuals for the workforce each year. Many systems, programs, and other vehicles in which the State and its partners do this work can be leveraged to meet growing clean and sustainable jobs, as numbered below.

#### **1. Minnesota’s Public Primary and Secondary Schools**

The state’s public education system operates through a decentralized delivery system that involves over 2,000 primary and secondary schools across more than 300 independent school districts. Several offer career and technical education programs that provide both career exploration and hands-on learning opportunities, while other districts offer career academies to educate and train students for specific in-demand jobs.

#### **2. Community and Technical Colleges**

Community colleges in Minnesota serve several roles in delivering education and training to workers, including providing one- or two-year credentials in technical occupations, two-year associates degrees, non-degree technical skills education that results in an industry-recognized credential, and by responding to local or regional business training needs by working directly with businesses to deliver customized training. Minnesota State oversees eight “Centers of Excellence”, each serving a major industry in the state experiencing workforce difficulties to provide for collaboration with employers to prepare students for in-demand careers.

#### **3. Four-Year Colleges and Universities**

Public and private four-year colleges and universities in Minnesota provide education opportunities in many clean and sustainable fields. The University of Minnesota, offers nearly 300 different degrees/ majors, including many from in-demand fields within the changing economy, such as environmental science, forestry, various engineering programs (including industrial engineering and geoengineering), construction management, agriculture, and sustainability. Additionally, the University of Minnesota’s College of Continuing and Professional Studies provides short-term training and helps individuals with previous credentials, college credits, or work experience obtain a degree or professional certification in a shorter timeframe.

#### **4. Department of Labor and Industry (DLI) programs, including registered apprenticeship**

DLI promotes registered apprenticeship, a work-based career development program in multiple industries. Approximately 90 percent of active apprentices are training in the construction industry. There are typically between 9,000 and 10,000 apprentices training in construction apprenticeship programs throughout the state. DLI also administers the Dual-Training Pipeline jointly with the Office of Higher Education (OHE), and the Youth Skills Training (YST) program, which focus training on key industries outside of construction, including advanced manufacturing, agriculture, health care, IT, and, additionally for YST, automotive.

## 5. WIOA and the Public Workforce Development System

The Workforce Innovation Opportunity Act (WIOA) provides policies and funding that collectively make up the federal “workforce development system”, also called the CareerForce system. Most of these funds must be used to provide training services that lead to obtaining a quality postsecondary and/or industry-recognized credential. Information on WIOA-eligible training programs is made available to the public and grantees on DEED’s Career and Education Explorer Tool.<sup>115</sup> In addition to training services, other WIOA funding goes to providing employer services, which includes engaging directly with businesses to identify partnership opportunities, and employment services, which includes job navigation and supports for job seekers.

Per federal regulations and funding levels, the majority of federal WIOA funds are designated for training programs done by the state’s 16 local workforce development boards. The various entities that oversee these boards and their service areas include nonprofits, government entities, and entities governed by various joint-powers agreements or other shared structures, and they are tasked to coordinate WIOA and other workforce development programs for their areas. These entities, their service areas, and the 57 CareerForce locations across the state that are often used to serve job seekers and employers in this system are shown below.

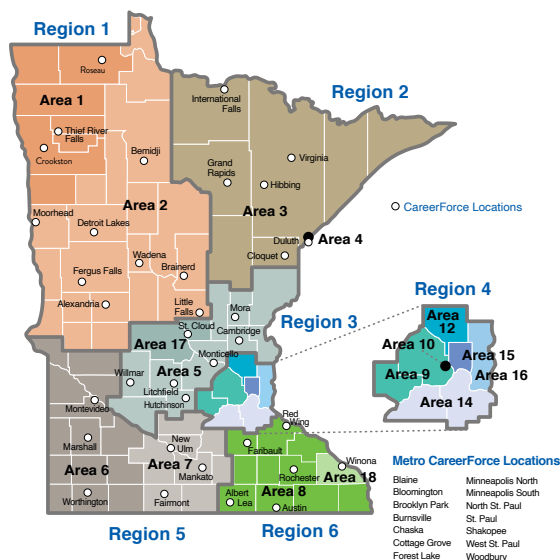
### LOCAL AND REGIONAL WORKFORCE DEVELOPMENT (WFD) AREAS<sup>116</sup>

#### Local and Regional WFD Areas

- WDA 1: Northwest Private Industry Council**
- WDA 2: Rural Minnesota Concentrated Employment Program (CEP)**
- WDA 3: Northeast Minnesota**
- WDA 4: City of Duluth**
- WDA 5: Central Minnesota (Central MN Jobs & Training Services)**
- WDA 6: Southwest Minnesota Private Industry Council**
- WDA 7: South Central Workforce Council**
- WDA 8: Southeastern Minnesota (Workforce Development, Inc.)**
- WDA 9: Hennepin-Carver Workforce Development**
- WDA 10: City of Minneapolis**
- WDA 12: Anoka County**
- WDA 14: Dakota-Scott Counties**
- WDA 15: Ramsey County**
- WDA 16: Washington County**
- WDA 17: Stearns-Benton Counties (S-B Career Solutions)**
- WDA 18: Winona County (w/additional DEED Support)**

Blue = County admin. entity (1 or more)  
 Red = Nonprofit admin. entity  
 Green = City Admin entity

Regional Workforce Development Areas  
 Local Workforce Development Areas



## 6. Minnesota Jobs Skills Partnership (MJSP) Grants

MJSP works with businesses, educational institutions, and nonprofit organizations to train or retrain workers, expand work opportunities, and keep high-quality jobs in the state. The goal of MJSP is to target short-term training for full-time employment in high growth sectors of the state’s economy. This is done through grants that fund programs to offset training-related expenses incurred by business, industry, nonprofit organizations, and educational institutions to meet current and future workforce needs.<sup>117</sup>

<sup>115</sup> “Career and Education Explorer.” *Minnesota Department of Employment and Economic Development*, <https://mn.gov/deed/data/data-tools/career-education-explorer/>. Accessed Jul. 2022.

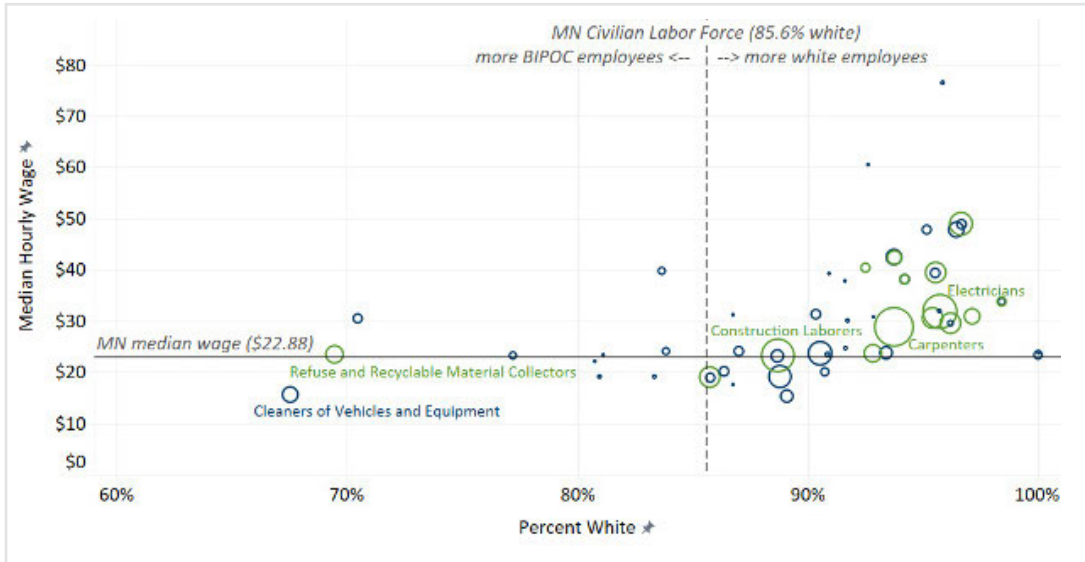
<sup>116</sup> “Minnesota’s Local Workforce Development Boards.” *Minnesota Department of Employment and Economic Development CareerForce*, <https://www.careerforcemn.com/local-workforce-development-boards>. Accessed Aug. 2022.

<sup>117</sup> “DEED Training Grant Programs.” *Minnesota Department of Employment and Economic Development*, <https://mn.gov/deed/business/financing-business/training-grant/>. Accessed Sep. 2022.

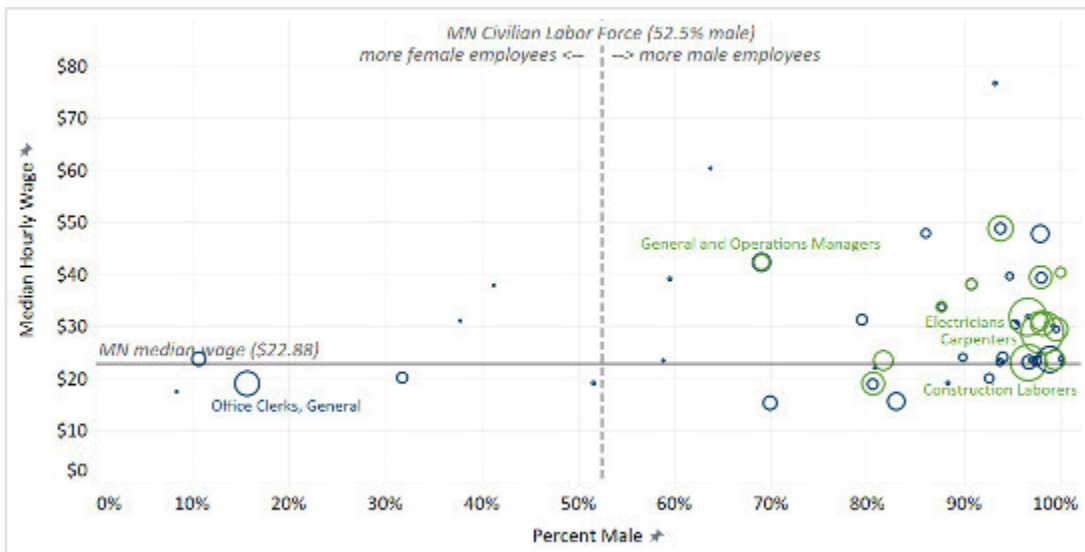
## APPENDIX B:

### Minnesota Clean and Sustainable Jobs by Median Wage, Race/Ethnicity Demographics<sup>118</sup>

#### MINNESOTA CLEAN AND SUSTAINABLE JOBS BY MEDIAN WAGE AND RACE/ETHNICITY DEMOGRAPHICS



#### MINNESOTA CLEAN AND SUSTAINABLE JOBS BY MEDIAN WAGE AND GENDER DEMOGRAPHICS



Each clean/sustainable occupation is marked by a circle, with the relative number of jobs in Minnesota indicated by circle size. Green circles represent occupations with a high number of jobs, high projected growth, and a family-sustaining median wage. Minnesota Civilian Labor Force (CLF) demographic data (dashed vertical line) and median wage data (solid horizontal line) are also shown for comparison.

<sup>118</sup> Data compiled by DEED from U.S. Bureau of Labor 2021 Occupational and Employment Wage Statistics and Minnesota 2006–2010 Affirmative Action Statistics.



## APPENDIX C:

### *Working Group Membership*

The Minnesota Business Vitality Council (MBVC) seeks to address the new economic opportunities in our global economy. Formed in 2020 by the Walz-Flanagan Administration, the MBVC is an interagency group in state government designed to tackle complex economic development issues, discover cross agency solutions, and capitalize on opportunities to grow Minnesota's economy. The MBVC is centered on work groups – where teams from relevant agencies come together for six-month project sprints to focus on burgeoning business opportunities critical to our state's economic growth.

The MBVC convened the clean and resilient jobs working group to provide a top-line analysis of the opportunities and challenges related to a more sustainable economy and related jobs. The working group identified strategic areas of focus and near-term opportunities to support both business growth and jobs along a career pathway that lead to a family-sustaining income.

The following representatives from nine State agencies formed the core working group for this clean and resilient jobs sprint:

- Anthony Alongi, Section Manager of Policy and Planning, Department of Natural Resources (DNR)
- David Bael, Economic Policy Analyst, Minnesota Pollution Control Agency (MPCA)
- Ben Baglio, Director of the Governor's Workforce Development Board, Department of Employment and Economic Development (DEED)
- David Bellefeuille, Veteran Program Director, Minnesota Department of Veterans Affairs (MDVA)
- Katherine Blauvelt, Assistant Commissioner, Department of Commerce (COM)
- Kate Getsie, Results Specialist, Minnesota Department of Management and Budget (MMB)
- Megan Lennon, Bioeconomy Program Manager, Minnesota Department of Agriculture (MDA)
- Elizabeth Mejicano, Results Specialist, MMB
- Craig McDonnell, Assistant Commissioner, MPCA
- Joel Peck, Municipal Liaison, MPCA
- Kate Perushek, Deputy Commissioner, Minnesota Department of Labor (DLI)
- Amy Schrempp, Director of Customer Innovation, DEED
- Carla Vita, Director of Energy Transition Office, DEED
- Katie Walker, Director of Research and Innovation, Minnesota Department of Transportation (MnDOT)

Additionally, the team received important support from:

- James Byerly, Electronic Resources Librarian, MnDOT
- Oriane Casale, Assistant Director of the Labor Market Information Office Darielle Dannen, DEED
- Savannah Ford, Researcher, DEED
- Dru Fryberg, Senior Librarian, DEED
- Sheila Hatchell, Library Director, MnDOT
- Natalie Siderius, Southeast Business Development Manager and Executive Director of Minnesota Business First Stop and Minnesota Business Vitality Council, DEED
- Mandi Schienebeck, Emerging Energy Technologies Program Manager, Minnesota Department of Commerce

## APPENDIX D:

### *Stakeholders Engaged in Sprint Process*

Group Engaged	Method of Engagement
Office of Higher Education	Several conversations
Minnesota Department of Education	Several conversations
Kyle Shelton, University of Minnesota	Interview
Larry Lundblad, Mary Rothschild, Minnesota State	Interview
Pennsylvania Dept of Labor & Industry	Interview
Minnesota Association of Workforce Boards (MAWB) Policy & Issues Committee	Focus group
MESC (MN Employment Services Consortia)	Interview
State government Tribal liaisons	Several conversations
Fon du Lac Tribal College	Interview
McKnight Foundation	Several conversations
Jen Byers, Minnesota Chamber	Interview
Don Hickman, Initiative Foundation	Interview
Green Jobs Committee, Ramsey County Workforce Board	Focus group
Duluth Workforce Improvement Board	Focus group
Jodie Greising, MN Jobs Skills Partnership Board	Several conversations
Gary Thaden, Mechanical Contractors Association of Minnesota	Interview
Tom Dicklich, Joe Fowler, Minnesota Buildings and Construction Trades Council	Interview
Jeff Beiriger, Minnesota Heating and Cooling Association	Interview
Gary Thaden, National Electrical Contractors Association – Minneapolis	Interview
Derrick Atkins, Apprenticeship training leaders	Interview
Colin Beere, Sheet Metal Workers SMART Local 10	Interview
Rose Patzer, Minnesota Energy Consortium/Center on Excellence	Interview
Jenny Winklaar, Local 49	Interview
Andy Snope, International Brotherhood of Electrical Workers (IBEW)	Interview
Jamie Fitzke, Center for Energy and the Environment	Interview
Kevin Pranis, Charles Sutton, Laborers' International Union of North America (LIUNA)	Interview
Gregg Mast, Clean Energy Economy Minnesota (CEEM)	Interview
Rachel Jones, National Association of Manufacturers	Interview
Les Engel, Midwest Manufacturers Association (CMMA)	Interview
Bree Halverson, BlueGreen Alliance	Interview
Pete Aube, Forestry Resources Council	Roundtable
Ray Higgins and Rick Horton, Bemidji and Grand Rapids local industry groups	Roundtable
Dr. Mike Kilgore, University of Minnesota	Roundtable
Emily Barker, Reuse Minnesota	Interview
Bill Keegan, Dem-Con	Interview
Ginny Black, Compost Council	Interview
Lindsey Fitzgerald, Tim Cesarek, GEVO	Focus group

Group Engaged	Method of Engagement
Ron Batey, Dustin Haaland, CHS	Focus group
Jeff Davidman, Delta	Focus group
Emmy Waldhart - Sustainability Manager, MAC	Focus group
JoAnne Berkenkamp, MBOLD + Greater MSP	Focus group
Luca Zullo, AURI	Focus group
Steve Csonka, CAAFI	Focus group
Mike Youngerberg, Joe Smentek MN Soybean	Focus group
Brendan Jordan, GPI	Focus group
Greg Gust, Brian Kletcher, MN Biofuels Association	Focus group
Amanda Bilek, MN Corn Growers Association	Focus group
Nancy Young, Alder Fuels	Focus group
Aaron Robinson, United Airlines	Focus group
Steve Metro, LanzaJet	Focus group
Anne Seckel and Graham Noyes, Low Carbon Fuels Coalition	Focus group
Janelle Greschner, IRRRB	Focus group
Stu Lorey, Farmers Union	Focus group
Amber Glaeser and Rachel Schaefer, Farm Bureau	Focus group
Nick Jordan, Colin Cureton, Forever Green	Focus group

