

Minneapolis Renewable Electricity and Energy Efficiency Workforce Assessment

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Table of Contents

Executive Summary	3
Background	5
About the Project Team	5
Approach and Methodology.....	6
Overview of Data Findings.....	8
About this Report	9
Section 1: Inclusive Policies and Strategies for Clean Energy Workforce Development	10
Clean Energy Workforce Demographics and Participation	10
Anticipated Local, State, and Private Sector Investment in Clean Energy	14
Recommendations for Inclusionary Clean Energy Workforce Development Programs and Policies.....	14
Section 2: High-Growth Occupations Supporting Clean Energy in Minneapolis	23
Policy Drivers Likely to Affect Minneapolis’s Clean Energy Workforce	23
Minneapolis Clean Energy Employer Hiring Expectations for 2019	28
Expected Growth, Earnings, and Training in High-Growth Clean Energy Occupations	30
Clean Energy Workforce Hiring and Workforce Development Challenges and Opportunities .	32
Strategies to Address Hiring and Workforce Development Challenges	33
Linkages with Other Sectors and Emerging Occupations	35
Section 3: Training Providers.....	37
Section 4: Engaging Partners, Stakeholders, and Communities	41
Synthesis of City and Partner Engagement and Intervention Strategies in Clean Energy Workforce Development.....	41
Target Community and Resident Engagement Strategies	45
Section 5: Inclusion and Equity Opportunities in Clean Energy Financing	46
Conclusion and Next Steps	48

Executive Summary

In late 2018, the National Association of State Energy Officials (NASEO), the Energy Futures Initiative (EFI) and BW Research Partnership (BW Research) partnered with the City of Minneapolis's Offices of Sustainability and Community Planning and Economic Development (CPED) to undertake the Minneapolis Renewable Electricity and Energy Efficiency Workforce Assessment. It is intended to inform key stakeholders, including the Minneapolis Clean Energy Partnership and Energy Vision Advisory Committee, of current and future careers and occupations in the energy efficiency and renewable electricity fields.

Key themes from the assessment include:

- **Opportunities for equitable growth in Minneapolis's clean energy economy.** Through mechanisms such as the utility franchise fee, the Clean Energy Partnership, building energy benchmarking program, and other initiatives, the City of Minneapolis has helped catalyze significant investments and progress in clean energy technology and economic growth. Yet, pockets of high unemployment, concentrated in minority neighborhoods, suggest that there remain significant opportunities for greater racial, ethnic, and gender diversity and inclusivity in developing the City's clean energy workforce. This highlights an opportunity for employment policy in the City to be more closely focused on empowering racial and ethnic minorities, particularly in disadvantaged communities, to enter the growing clean energy workforce.
- **The need to scale-up the size of the clean energy workforce as well as clean energy investment as the City pursues its 100% Renewable Electricity goals.** The current size of the workforce may be insufficient to meet the drastic scale-up in energy efficiency and renewable electricity investments that will be needed to meet the City's goals. Financing and funding mechanisms also need to be expanded for both solar projects and commercial, industrial and residential energy efficiency programs, to create clear signals for clean energy employers to scale up their hiring. At the same time, many clean energy employers (particularly small businesses) experience difficulty finding and hiring qualified candidates, and the oncoming retirement of workers in the building trades across the state of Minnesota¹ is likely to exacerbate these difficulties. These dynamics present an opportunity to the City, energy employers, labor unions, training providers, and other workforce partners to work together to build a well-trained and increasingly diverse workforce.
- **The need for co-investment across multiple stakeholders.** Responsibility for building and honing Minneapolis's clean energy workforce does not rest exclusively with City agencies. Although the City has assumed a leadership role in setting ambitious climate, clean energy, and economic and racial equity goals, the potential benefits of reaching these targets will be reaped by a wide variety of stakeholders, including residents, businesses, and city, county,

¹ Foshay, E. and B. Steigauf, Minnesota Energy Efficiency Workforce Gap Analysis, March 2019. <https://www.mncee.org/resources/resource-center/technical-reports/minnesota-energy-efficiency-workforce-gap-analysis/>.

and state governmental agencies. Similarly, preparing the workforce to meet energy and climate goals will have multiple benefits, including for employers, unions, and trainers.

- **The need for training and education to achieve family-sustaining wages and career advancement in clean energy:** In key energy efficiency and renewable electricity occupations, there is a positive correlation between earnings and the time and effort required for individuals to invest in on-the-job training, dispelling the common perception that clean energy jobs require low-skilled workers. Only in limited cases—such as entry-level construction laborer positions or entry-level administrative positions—are clean energy jobs readily accessible to individuals with little or no education or prior work experience. This means that unskilled and uneducated individuals cannot become clean energy workers in a very short time span; targeted and sustained investment is needed to bring disconnected and disadvantaged City residents into the clean energy field through a variety of work readiness and pre-apprenticeship programs.
- **Opportunities to better connect training programs and offerings.** Overall, Minneapolis and its surroundings appear to have a significant number of training offerings, and a wide selection of options ranging from basic skills and job coaching to intensive academic and apprenticeship opportunities. Yet, an individual unfamiliar with clean energy employment opportunities may have difficulty navigating these options, as very few providers appear to present a turnkey series of programs offering a clear training pathway. Additionally, many programs do not seem to have formal relationships with employers, raising questions about the ability of these training opportunities to result in sustainable and family-sustaining employment for graduates. This presents an opportunity for the City to educate Minneapolis job-seekers on clean energy training and career opportunities and for the establishment of a dedicated program to encourage coordination among existing providers and employers.

Specific recommendations and strategies described in this report include:

For City Agencies:

- Leveraging existing employment and training programs to assist underserved individuals in navigating and accessing clean energy occupations;
- Pursuing comprehensive projects that integrate solar, energy efficiency, and other sustainable practices such as building deconstruction and materials recycling;
- Enhancing inclusive contracting and procurement policies and practices for City-funded projects by supporting small, minority-owned, and women-owned businesses;
- Communicating plans and programs to scale-up investments in energy efficiency and renewable electricity in pursuit of the City's climate and energy goals, so that employers, unions, and trainers may plan and adjust their services, staff, and contractor base accordingly;
- Serving as a trusted convener and source of information on clean energy training and career pathways and success stories;

- Cultivating and maintaining relationships with organizations representing disadvantaged communities and individuals in the City; and
- Encouraging clean energy and energy efficiency financing and incentive programs offered in the City to ensure economic and employment returns for disadvantaged and underserved residents, for instance by creating incentives or requirements for participating contractors to include workforce diversity goals.

For Clean Energy Employers, Labor Unions, and Training Providers in Partnership with the City:

- Adopting inclusive hiring and contracting policies;
- Building clean energy employment partnerships with utilities, their unions, and underserved communities;
- Co-investing in training program expansion; and
- Emphasizing the need for public education reform to expose young residents to Science, Technology, Engineering, and Mathematics (STEM) and the industrial arts.

The project team used a combination of online literature review, quantitative data analysis, and stakeholder interviews to inform our findings. The following report offers more detail on potential policies and strategies that the City may be able to undertake to support resident workforce preparedness, skills development, and access to job opportunities as the City plans investments in renewable electricity and energy efficiency projects to meet municipal and citywide clean energy and carbon reduction goals.

Background

In late 2018, the National Association of State Energy Officials (NASEO), the Energy Futures Initiative (EFI), and BW Research Partnership (BW) partnered with the City of Minneapolis Offices of Sustainability and Community Planning and Economic Development (CPED) to undertake the Minneapolis Renewable Electricity and Energy Efficiency Workforce Assessment.

This section provides background information pertaining to the project team, the approach and methodology used, and key data findings that may help provide context for the remaining sections of the Workforce Assessment.

About the Project Team

NASEO is the only national non-profit association for the governor-designated energy officials from each of the 56 states, territories, and the District of Columbia. Formed by the states in 1986, NASEO facilitates peer learning among state energy officials, serves as a resource for and about state energy offices, and advocates the interests of the state energy offices to Congress and federal agencies.

EFI conducts objective, fact-based and rigorous technical, economic, financial and policy analyses supported by a multidisciplinary network of experts, who provide policymakers, industry leaders,

NGOs and other leaders with analytically-based, unbiased policy options to advance a cleaner, safer, more affordable and more secure energy future.

BW Research is a full-service applied research firm that is focused on supporting our clients with economic and workforce research, customer and community research, as well as strategic planning and evaluation services.

Together, NASEO, EFI, and BW form the team behind the 2018 and 2019 U.S. Energy and Employment Report (USEER). First published by the U.S. Department of Energy in 2016 and 2017, the USEER uses data collected from thousands of energy sector employers across the country to provide consistent and complete definitions and quantifications of energy jobs across five key sectors of the energy economy: fuels; electric power generation; transmission, distribution, and storage; energy efficiency; and motor vehicles and component parts.² The USEER provides energy jobs numbers by U.S. state, available through state-specific fact sheets produced by the project team.³

Approach and Methodology

The project team used a three-pronged approach to inform the development of the Minneapolis Workforce Assessment, including data collection and analysis; online literature and best practice review; and stakeholder interviews:

- **Data Collection and Analysis:** To collect data informing the development of this report, BW Research leveraged the national employer outreach and data collection effort already underway in the third quarter of 2018 in support of the 2019 USEER. The survey instrument, attached as Appendix 1, and underlying methodology are identical to that used in the primary data collected on behalf of the U.S. Department of Energy (OMB Control No. 1910-5179⁴) for the 2017 USEER.

The Minneapolis Workforce Assessment project was the first time USEER data has been used to provide specific employment information and recommendations at the city level. For this reason, BW Research conducted an oversampling of Minneapolis-based renewable energy and energy efficiency sector employers to ensure adequate results and an acceptable margin of error, resulting in a sample size of 259 employers and a margin of error of +/- 6% at a 95% confidence interval. For the purposes of this report, we define clean energy employers and clean energy workers as follows:

- *Clean Energy Employer:* An organization based in Minneapolis with employees in the United States that is directly involved with researching, developing, producing, manufacturing, distributing, selling, implementing, installing, or repairing components,

² National Association of State Energy Officials (NASEO) and Energy Futures Initiative (EFI), 2019 U.S. Energy and Employment Report (USEER), March 2019, <https://www.usenergyjobs.org/about>.

³ NASEO and EFI, 2019 USEER, <https://www.usenergyjobs.org/2019-report>.

⁴ U.S. General Services Administration Office of Management and Budget, Control No. 1910-5179, September 2016, https://www.reginfo.gov/public/do/PRAViewICR?ref_nbr=201606-1910-001

goods or services related to renewable electric power generation and energy efficiency, including heating, cooling and building envelope; and renewable fuels. This also includes supporting services such as consulting, finance, tax, and legal services related to renewable electricity generation and energy efficiency. Retail establishments are excluded from the analysis.

- *Clean Energy Worker*: Employee of a clean energy employer that spends some portion of his/her time supporting the qualifying renewable electricity generation or energy efficiency portion of the business.

The USEER survey instrument is an employer survey; therefore, this Workforce Assessment analysis does not provide information specific to Minneapolis residents' participation in the clean energy workforce. Rather, it offers an examination of total workers, workforce demographics, hiring difficulties and projections, and other data points shared by Minneapolis-based employers. Where appropriate and where granular data for Minneapolis specifically is unavailable, clean energy sector employment data from the seven-county⁵ Metropolitan Statistical Area (MSA), with a particular focus on Hennepin County, are cited in order to provide additional points of context.

- **Online Literature and Best Practice Review:** The project team conducted an online literature review in order to understand best practices and program and partnership models that support various priorities in energy efficiency and renewable electricity workforce development. A strong emphasis is placed on research covering inclusive and equitable hiring, procurement, and contracting practices; local government policy and investment levers that may result in job creation and economic development opportunities; and the career pathways and core skillsets that support municipal and private clean energy projects in Minneapolis. Appendix 2 includes a scan of major works consulted in the development of this report, a sampling of model programs and practices that may have relevance to Minneapolis's workforce development and training efforts, as well as an inventory of existing training providers and programs operating in and near Minneapolis.
- **Stakeholder Interviews:** The project team held stakeholder interviews in January and February 2019 with a sample of local labor unions, nonprofit organizations, and major energy employers. In advance of each meeting, the project team shared discussion guides or prepared informational presentations in order to provide background on the Workforce Assessment project and to offer prompts for the discussion. Appendix 3 includes a list of organizations that participated in the stakeholder interviews, a synthesis of key findings and themes from the discussions that helped inform the development of this report, and the discussion guides and presentations used to prepare the conversations.

⁵ The seven-county MSA used for this report includes Hennepin (where Minneapolis is located), Ramsey, Anoka, Dakota, Washington, Scott, and Carver counties.

Overview of Data Findings

Based on the sample of Minneapolis-based clean energy employers surveyed, we estimate that there are approximately 10,820 workers in energy efficiency and 1,878 workers in renewable energy generation in the city, for a total of 12,698 clean energy workers. Figures 0-1 and 0-2 offer a breakdown of workers in the energy efficiency and renewable energy fields by specific technology applications.

Energy efficiency and renewable energy activities account for a significant portion of Minneapolis clean energy workers' time. Overall, 82% of clean energy workers in Minneapolis spend 100% of their time on energy efficiency or renewable energy activities. Breaking this down further, 81% of energy efficiency workers and 86% of renewable energy workers spend all of their time on energy efficiency and renewable energy projects and activities.

Figure 0-1. Breakdown of Workers in Energy Efficiency Technologies in Minneapolis.⁶

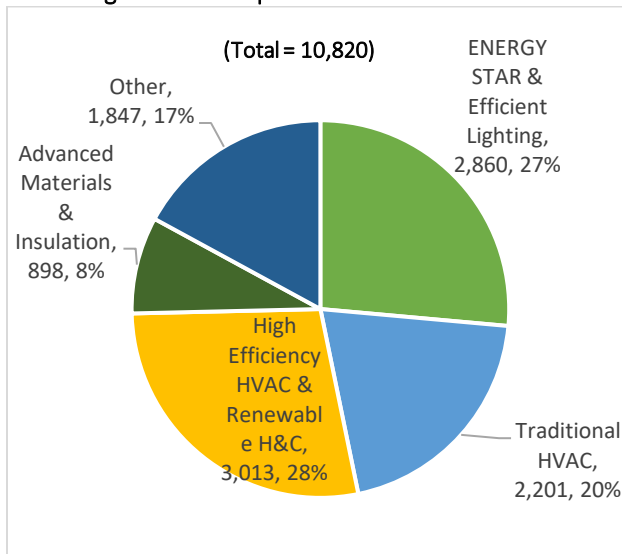
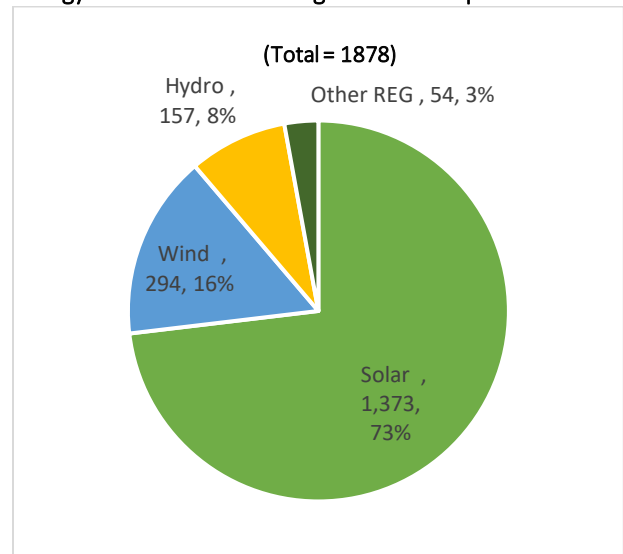


Figure 0-2. Breakdown of Workers in Renewable Energy Generation Technologies in Minneapolis.



Although granular historic data for the City of Minneapolis is unavailable, clean energy employment trends at the county level suggest that both sectors have experienced growth since 2016. In Hennepin County, energy efficiency jobs grew by 977 jobs, or 6%; and renewable energy jobs grew by 1,910 jobs, or 52%. Figures 0-3 and 0-4 illustrate growth in clean energy jobs by county between 2016 and 2018.

⁶ Unless otherwise stated, data is from the 2019 U.S. Energy and Employment Report, March 2019, NASEO and EFI.

Figure 0-3. Year-Over-Year Growth in Energy Efficiency Workers by County

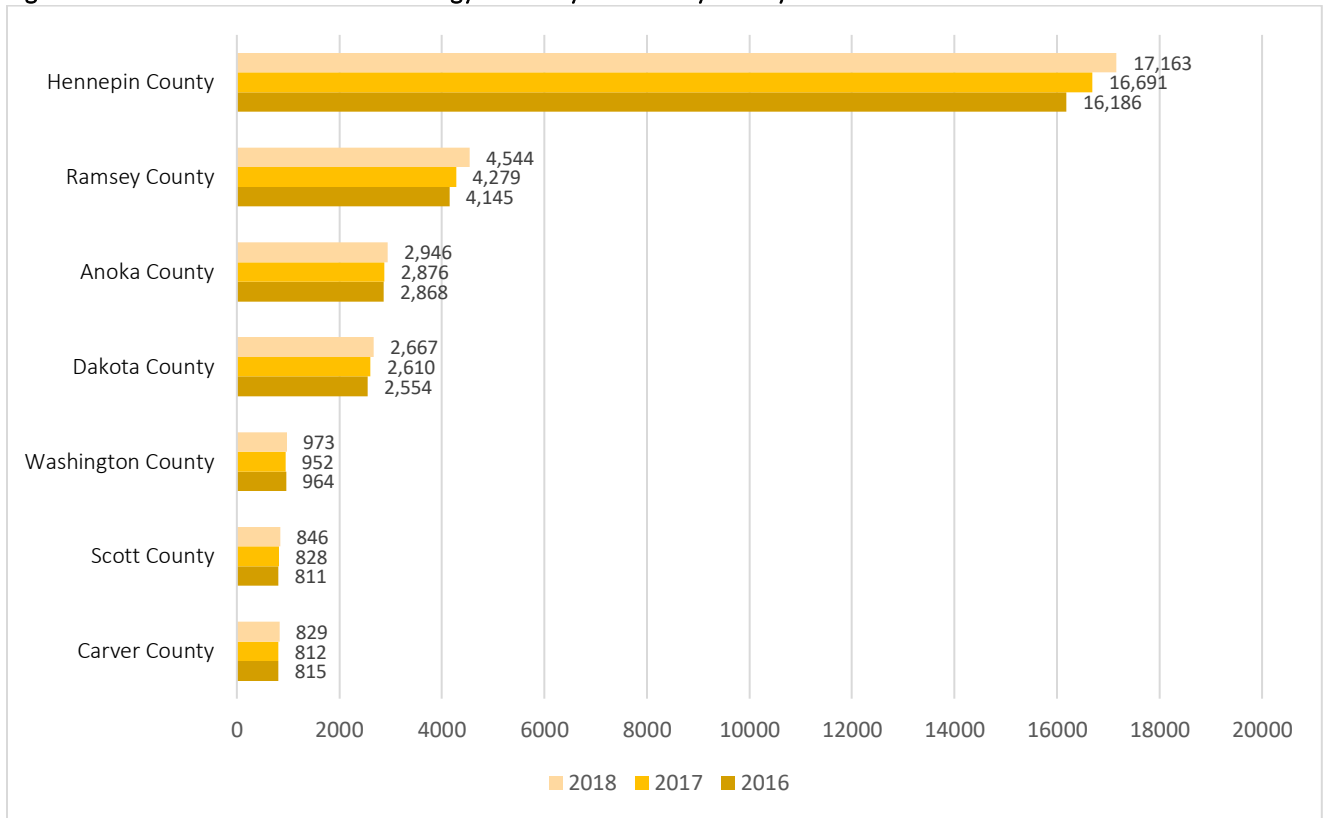
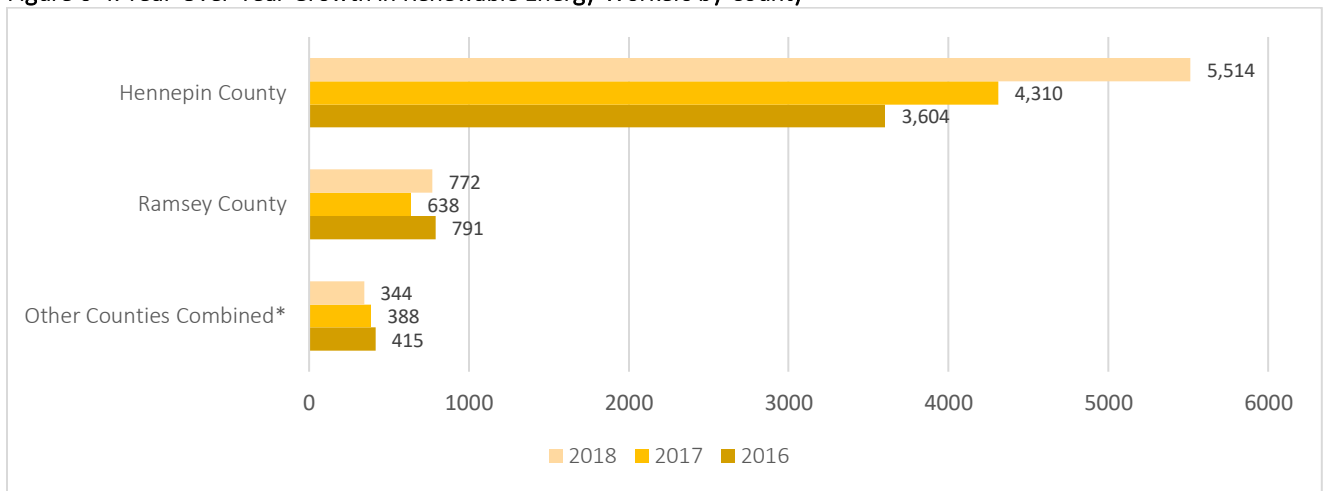


Figure 0-4. Year-Over-Year Growth in Renewable Energy Workers by County



About this Report

The remaining sections of this report are structured to respond directly to the call for proposals issued in October 2018 (available as Appendix 4) by the Office of Sustainability and CPED seeking to create a Workforce Development Assessment of current and future careers and occupations in the energy efficiency and renewable electricity fields. Each section of this report pertains to specific priorities cited by the City in the scope of research, covering:

1. **Section 1:** Potential policies and strategies that the City can employ to facilitate training and hiring of residents from communities of color, women, new generations of workers, veterans, and indigenous populations for careers in the clean energy economy.
2. **Section 2:** An assessment of high-growth occupations and an estimate of the number of and type of new positions, salary range, and necessary training needed to access these high-growth occupations.
3. **Section 3:** An environmental scan of existing training providers preparing individuals for employment in renewable electricity and energy efficiency-related occupations.
4. **Section 4:** Recommendations for continual engagement with city, county, and state workforce development organizations, training partners, and high-growth employers and industries; and recommendations for community outreach and engagement necessary to recruit, train, and retain members of the target communities by high-growth employers in the energy industry.
5. **Section 5:** Recommendations for policies to consider when implementing an inclusive financing program to ensure that economic returns on these programs result in opportunity for underserved communities and populations.

The report concludes with an identification and brief discussion of next steps, including efforts that can be achieved in the near-term and those that may require longer-term focus, investment, and coordination.

Section 1: Inclusive Policies and Strategies for Clean Energy Workforce Development

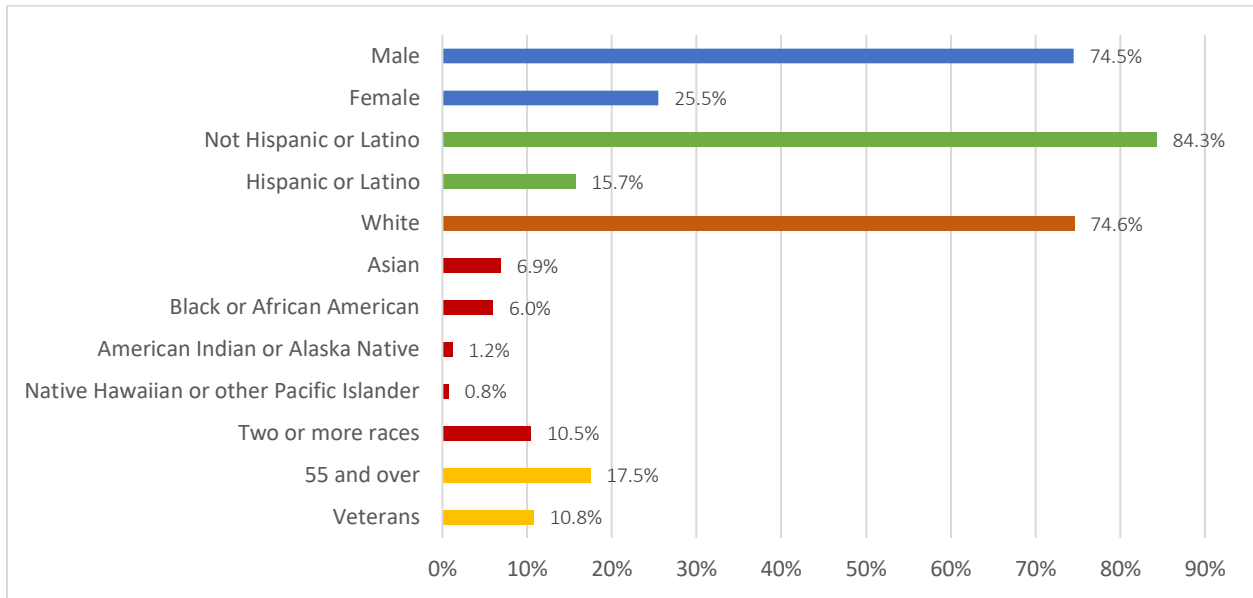
This section explores potential policies and strategies that the City can employ to facilitate training and hiring of residents from communities of color, women, new generations of workers, veterans, and indigenous populations for careers in the energy economy. Specifically:

- Policies, strategies and targets for labor participation that would support the implementation of the “Blueprint for Powering Minneapolis Municipal Operations with 100% Renewable Electricity by 2022”;
- Policies, strategies and targets for labor participation (particularly within the next five years) that would support the achievement of the goal of 100% renewable electricity community-wide by 2030; and
- Policies, strategies, programs, occupational standards, related training requirements, training gaps, and resources required to ensure fair and equitable access to public and private sector careers in renewable electricity and clean technologies.

Clean Energy Workforce Demographics and Participation

Data collected by BW Research for this report indicates that the energy efficiency and renewable electricity workforce in the City of Minneapolis is predominantly white (74.6%) and male (74.5%). Figure 1-1 presents key workforce demographic data by gender, Hispanic or Latino ethnicity, race, and other attributes such as age and veterans’ status.

Figure 1-1. Minneapolis Energy Efficiency and Renewable Energy Workforce Key Demographics



In comparison to statewide workforce averages (not limited to the energy industry), the City of Minneapolis’s energy efficiency and renewable energy workforce is less gender-diverse overall, but generally more ethnically and racially diverse, with a lower rate of workers aged 55 and over, and with a higher rate of veterans. Figure 1-2 compares key demographics of Minneapolis’s energy efficiency and renewable energy workforce to statewide and national averages.

Figure 1-2. Minneapolis Energy Efficiency and Renewable Energy Workforce Demographics Compared to Statewide and National Workforce Averages

	Minneapolis EE/RE Workforce	Minnesota Workforce ⁷	National Workforce ⁸
Male	75%	50%	53%
Female	26%	50%	47%
Not Hispanic or Latino	84%	95%	83%
Hispanic or Latino	16%	5%	17%
White	75%	86%	78%
Asian	7%	5%	6%
Black or African America	6%	6%	12%
American Indian or Alaska Native	1%	1%	1%
Native Hawaiian or Other Pacific Islander	1%	1%	1%
Two or More Races	11%	2%	2%
55 and Over	18%	22%	23%
Veterans	11%	9%	6%

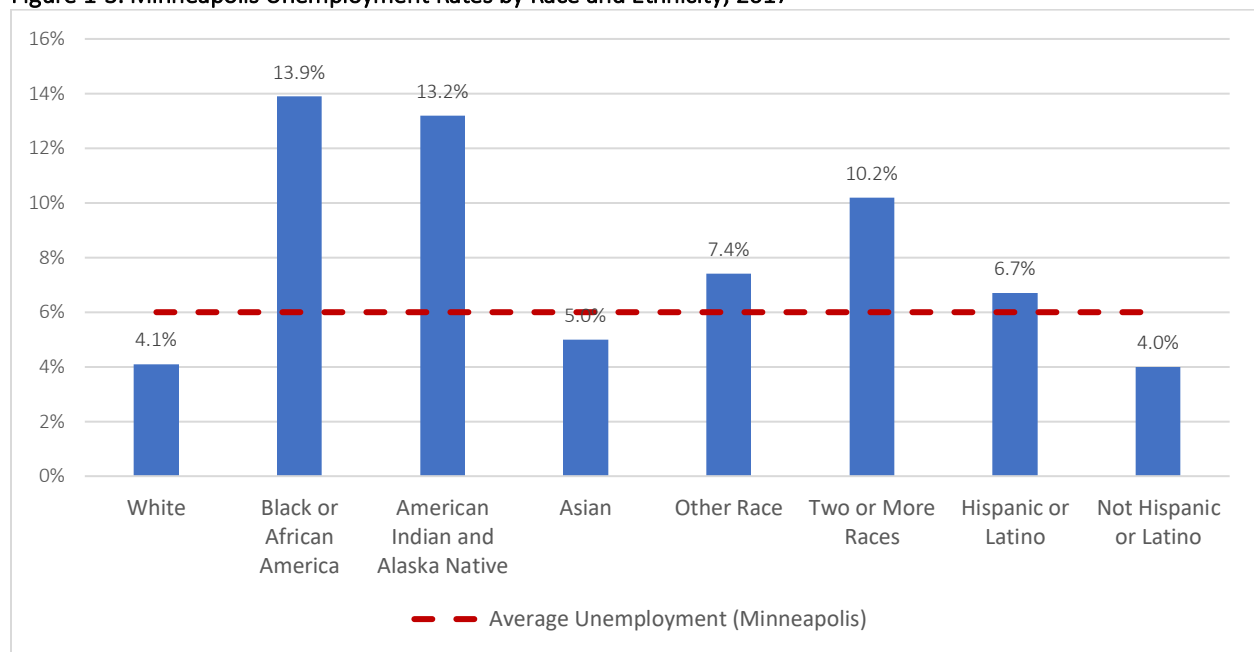
⁷ NASEO and EFI, Minnesota Energy and Employment Report, May 2019.

⁸ U.S. Bureau of Labor Statistics, Demographics, 2018. <https://www.bls.gov/cps/demographics.htm>.

In comparison to the City as a whole, U.S. Census Bureau data indicate that the City's demographic composition is markedly more diverse than the clean energy workforce, at 60% non-Hispanic or Latino white and 51% male, with those of Black or African American descent representing approximately 19% and Hispanics or Latinos at 10% of the population.⁹ While this does not offer a one-for-one comparison (Census data reflect all age groups, not just residents of workforce age), it offers an additional point of context and may suggest that as new generations of City residents come of workforce age, there may be a gradual increase in clean energy workforce diversity in the City.

The U.S. Census Bureau estimates that unemployment in the City of Minneapolis is approximately 6.0% (based on 2017 data). Yet, racial and ethnic minorities in Minneapolis experience higher unemployment rates compared to their white counterparts. Black or African American people face a 13.9% unemployment rate, over four times the Minnesota state unemployment rate of 3.4%¹⁰ and more than double the City average unemployment rate. Hispanics/Latinos in Minneapolis also face an unemployment rate of 6.7%, nearly double the statewide rate. In 2018, income and employment disparities in the Twin Cities prompted an analysis by 24/7 Wall Street to rank Minneapolis as the fourth worst city in the United States for black Americans.¹¹

Figure 1-3. Minneapolis Unemployment Rates by Race and Ethnicity, 2017¹²



⁹ United States Census Bureau, Quick Facts: Minneapolis City, Minnesota, accessed March 8, 2019.

<https://www.census.gov/quickfacts/fact/table/minneapoliscityminnesota/RHI125217#RHI125217>

¹⁰ U.S. Bureau of Labor Statistics, Local Area Unemployment Statistics, Seasonally Adjusted, Minnesota, 2017.

<https://www.bls.gov/eag/eag.mn.htm>

¹¹ Stebbins, S. and E. Comen, These are the 15 worst cities for black Americans, USA Today, November 2018.

<https://www.usatoday.com/story/money/2018/11/16/racial-disparity-cities-worst-metro-areas-black-americans/38460961/>

¹² U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates. S2301, Minneapolis City, Minnesota.

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S2301&prodType=table

Figure 1-4. Unemployment Rate by Census Tract, Minneapolis¹³

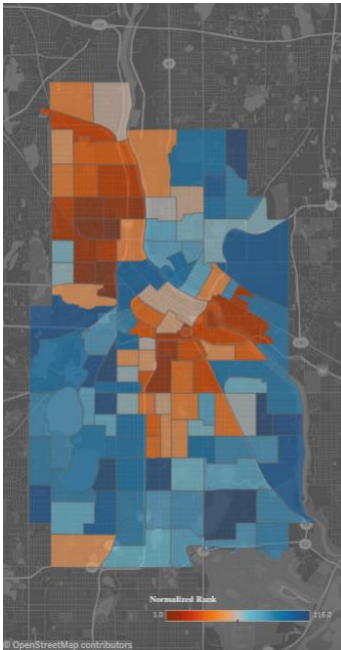
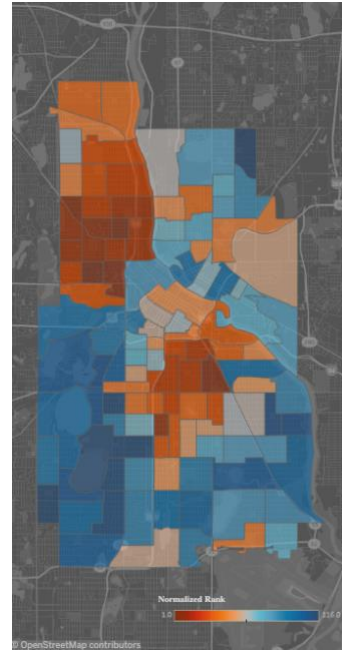


Figure 1-5. Percent of People of Color and Indigenous Peoples by Census Tract, Minneapolis¹⁴



As demonstrated in Figures 1-4 and 1-5, racial and employment disparities in the City of Minneapolis tend to be concentrated in specific neighborhoods. The maps depict Minneapolis communities by unemployment rate and percent of people of color and indigenous populations based on U.S. Census Bureau 2015 American Community Survey estimates and mapped by the Minneapolis Office of Sustainability through the “Minneapolis Population Characteristics and Environmental Indicators Map.” The maps reveal pockets of high unemployment throughout the city, coinciding heavily with census tracts with high rates of residents of color and indigenous origin. The tracts with the highest unemployment (represented in dark red) are concentrated in the northwest quadrant of the city and correlate with the boundaries of the Minneapolis Northside Green Zone.¹⁵

Through mechanisms such as the utility franchise fee, the Clean Energy Partnership, building energy benchmarking program, and other initiatives, the City of Minneapolis has helped catalyze significant investments and progress in clean energy technology and economic growth. Yet, these pockets of high unemployment, concentrated in minority neighborhoods, suggest that there remain significant opportunities for greater diversity and inclusive practices in developing the City’s clean energy workforce. This highlights an opportunity for employment policy in the City to be more closely focused on empowering racial and ethnic minorities, particularly in

¹³ U.S. Census Bureau, American Community Survey 5-Year Estimates. 2015. <http://www.ci.minneapolis.mn.us/sustainability/policies/WCMSP-187876>

¹⁴ U.S. Census Bureau, American Community Survey 5-Year Estimates, 2015. <http://www.ci.minneapolis.mn.us/sustainability/policies/WCMSP-187876>

¹⁵ City of Minneapolis, “Green Zones Initiative,” accessed April 12, 2019. <http://www.ci.minneapolis.mn.us/sustainability/policies/green-zones>

disadvantaged communities, to enter the growing clean energy workforce. Moving forward, this report may help establish a baseline or benchmark by which to assess demographic participation in the City's clean energy workforce.

Anticipated Local, State, and Private Sector Investment in Clean Energy

Since 2013, the City has advanced two sets of goals that are expected to result in substantial new local and private sector investment in clean energy projects:

- **100% Renewable-Powered Municipal Operations by 2022:** The *Blueprint for Powering Minneapolis Municipal Operations with 100% Renewable Electricity by 2022* offers a method and timeline for the City to claim, by 2022, that 100% of its electricity usage is sourced from renewable energy. Key features of the *Blueprint* include increasing the purchase of Renewable*Connect electricity and Renewable Energy Credits (RECs); maximizing the amount of solar generation on city-owned facilities and large city-owned buildings; and increasing the number of community solar garden subscriptions (with the goal of generating cost savings that will offset the increased costs associated with investments in Renewable*Connect and RECs).¹⁶
- **100% Community-Wide Renewable Electricity by 2030:** To guide community-wide efforts, the Minneapolis Climate Action Plan offers a roadmap to reducing citywide greenhouse gas emissions. Key features of this plan include significantly improving energy efficiency in commercial, residential, and public buildings; increasing the use of local, renewable energy; and reducing waste.¹⁷

Recommendations for Inclusionary Clean Energy Workforce Development Programs and Policies

The clean energy investments required to reach the City's renewable electricity goals will create opportunities for entrepreneurship, employment, and workforce development. Yet, ensuring that these outcomes accrue equitably and to the benefit of historically underserved and disadvantaged populations is less straightforward. Most likely, it will require the City and its partners (such as the energy utilities, Xcel Energy and CenterPoint Energy) to double-down on inclusive procurement and workforce policies and practices that promote opportunity and access, and that aim to mitigate the disproportionately high unemployment rates experienced by people of color, indigenous people, and other minorities in the City.

The following recommendations highlight inclusionary policies and strategies that can help disadvantaged residents in Minneapolis participate more readily in the clean energy workforce:

1. **Create and coordinate an "On-Ramp" initiative for the City's high-need residents by promoting and subsidizing basic skills training, job readiness activities, and job placement services.**
A comprehensive approach to aid residents interested in pursuing a clean energy career should include services such as basic skills training (in worksite awareness and safety, interview and sales skills, and basic math and language ability); pre-apprenticeship training

¹⁶ City of Minneapolis, *Blueprint for Powering Minneapolis Municipal Operations with 100% Renewable Electricity by 2022*, October 2017. <http://www.minneapolismn.gov/sustainability/buildings-energy/WCMSP-210721>.

¹⁷ City of Minneapolis, *Climate Action Plan*, June 2013.

<http://www.minneapolismn.gov/www/groups/public/@citycoordinator/documents/webcontent/wcms1p-109331.pdf>.

and skill-building in energy efficiency and renewable energy technologies; and job placement services to connect high-performing participants with paid on-the-job training opportunities.

Oakland, California's Green Jobs Corps offers a multi-phase, turnkey "green collar training" program for disadvantaged residents. During the recruitment and pre-education phases, the Cypress Mandela Training Center recruits and assesses low-income young adults and provides pre-construction and basic skills training. During the green-collar skills training and education phase, led jointly by Cypress Mandela and a local community college, participants earn community college credit and receive education in solar installation, energy efficiency retrofits, green construction, and environmental sustainability and social justice principles. The final phase, led jointly by Cypress Mandela and Growth Sector, Inc., a workforce intermediary connecting employers, government, and community agencies, places participants into paid on-the-job training opportunities and apprenticeships, and provides continuing case management and support services for employers and trainees. After successful completion of the program, graduates are placed in full-time jobs with solar firms and green construction contractors, with typical starting wages between \$12 and \$16 per hour.¹⁸

To provide a turnkey suite of services in the model of Oakland's Green Jobs Corps, the City of Minneapolis would need to utilize and coordinate among a number of existing career development programs and partners, and potentially create new streams of funding and programming. The following steps illustrate a potential clean energy workforce training "On-Ramp Program" that various City agencies, led by CPED playing a case management role and Sustainability serving a connector role to the clean energy industry, can help support for jobseekers:

- **Step 1 - Identification and recruitment of prospective clean energy workers:** CPED's Employment and Training Division connects Minneapolis youth and adults with services to enter into the workforce, through programs such as Minneapolis Youth Works, Career Pathways Trainings, Minneapolis Works, and the Dislocated Worker and the WIOA Adult Programs, as well as job training and hiring events. These programs provide an array of services to job seekers, including personalized career guidance, career counseling services, skills training, and job search.¹⁹ They also provide a foundation from which prospective workers can access training and support for clean energy careers. Although these initiatives do not have an explicit connection to clean energy, they offer an entry point for CPED staff and program partners to educate jobseekers on employment pathways in the clean energy workforce, and to recruit, prepare, and refer individuals for further training opportunities.

¹⁸ Cypress Mandela, Inc. Training Center, Green Jobs Program website, accessed April 1, 2019. http://www.cypressmandela.org/our_programs/green_jobs_program.

¹⁹ Community Planning and Economic Development, Minneapolis Employment and Training, accessed April 1, 2019. <http://www.minneapolismn.gov/cped/metp/JobSeekerServices>.

- **Step 2 - Connections with basic skills and clean energy training providers:** CPED can channel referrals to various training partners in and near Minneapolis, depending on jobseekers' academic and training credentials, vehicle access, and career preferences. Residents starting from scratch or transitioning their careers, may be most interested in basic education and pre-apprenticeship training in core fields, such as carpentry, insulation, demolition, or electrical work, that can ultimately lead into clean energy occupations. Incumbent workers or individuals with suitable experience in technical jobs, on the other hand, may benefit from exposure and access to academic programs, or could be fast-tracked to paid training opportunities.

It is important to note that encouraging participation by high-need (i.e., disadvantaged and income-limited) residents may require the provision of financial assistance or stipends, so that they do not need to choose between gaining career-building skills programs and addressing the immediate need to raise money for themselves and their families. (In the case of the Oakland Green Jobs Corps program, funds and support for participants are provided by federal green jobs grants; for Minneapolis, these funds could derive from the franchise fee or other forms of direct investment from the area utilities (Xcel and CenterPoint), who could benefit from a pipeline of diverse and pre-trained workers, and/or philanthropic or governmental grants.)

- **Step 3 – Connections to paid training and “learn and earn” opportunities:** CPED staff can further connect trainees to resources that will deepen their skill base and prepare them for sustainable and high-earning careers in the clean energy workforce. For example, CPED can connect trainees who have successfully undergone basic education and skills training with labor union partners that offer apprenticeship programs, partnerships with area contractors, and access to training facilities in fields such as construction, electrical, and insulation.

It is important to note that although apprentice tuition is likely to be free of charge and the eventual pay-off of union membership is significant,²⁰ the time commitment required of a union apprentice can be significant (up to 8000 hours, or roughly 5 years). It is also likely to require a driver's license and vehicle access, presenting a barrier to entry for those without the means to attain a license or mode of transport. Overcoming this barrier may require the City to provide financial and technical assistance to job seekers in this situation, or to partner with organizations that do. (For instance, in the Oakland Green Jobs Corps program, the Cypress Mandela Training Center provides social services and support including driver's license acquisition.)

²⁰ Research from the Economic Policy Institute finds that on average, a worker covered by a union contract earns 13.2% more in wages than a peer with similar education, occupation, and experienced in a nonunionized workplace in the same sector. Economic Policy Institute, How today's unions help working people: Giving workers the power to improve their jobs and unrig the economy, August 2017. <https://www.epi.org/files/pdf/133275.pdf>.

- **Step 4 – Placement into clean energy jobs:** CPED, in concert with the Office of Sustainability, can leverage the City’s partnerships with clean energy employers to connect high-performing trainees with employment opportunities in the field. In its 2019-2021 Work Plan, the Minneapolis Clean Energy Partnership, a joint initiative among the City, Xcel Energy, and CenterPoint Energy, establishes 10 Partnership activities designed to reduce greenhouse gas emissions, such as reducing natural gas use, installing electric vehicle charging infrastructure, implementing community solar gardens, and providing inclusive financing for energy efficiency.²¹ Several partnership activities offer workforce development opportunities that can help participants in the On-Ramp Program match their skills and interests to open and new positions. To the extent that such a program would help the utilities meet their own hiring needs as well as continue to diversify their employee and contractor base, this type of program presents an opportunity for co-investment and deeper coordination by the City and utility partners.
2. **Pair planned solar generation projects with investments in energy efficiency and, particularly for larger rehabilitation and building projects, encourage sustainable deconstruction practices.** For City-owned buildings and operations, maximizing the installation of cost-effective energy efficiency improvements and measures (particularly to reduce electric load) is generally considered a best practice, as it helps to streamline the cost and investment needed for solar generation projects.

An integrated (energy efficiency + solar) approach can also result in positive employment impacts. Research compiled by BW Research (discussed further in Section 2) suggests that one of the major points of entry for unskilled workers into energy efficiency and renewable energy jobs in Minneapolis is through construction laborer positions. Pairing energy efficiency with solar installations is likely to increase the number and types of construction workers needed to complete municipal projects, due to their increased complexity. By extension, it is also likely to provide project and job opportunities and exposure for lower-skilled and junior-level workers.

Additionally, City construction and rehabilitation projects should use sustainable building practices, such as building deconstruction and the use of recycled or salvaged materials. The process of deconstruction, as opposed to demolition, involves the manual and mechanical disassembly and sorting of building materials and equipment in order to maximize the recovery of materials for reuse. Its environmental benefits include decreased demolition waste destined for landfills, resulting in lower methane emissions; and increased availability of recycled and salvaged materials in construction, resulting in lower “embodied” energy and

²¹ Clean Energy Partnership Planning Team, Minneapolis Clean Energy Partnership 2019-2021 Work Plan, November 2018. https://mplscleanenergypartnership.org/wp-content/uploads/2018/11/CEP-2019-2021-Work-Plan_FINAL-APPROVED.pdf.

emissions in building construction and materials use.²² The intricacies of deconstruction make it a more expensive process than demolition; however, it also offers important employment opportunities: cities like Baltimore have prioritized deconstruction in order to address its blight problem while creating entry-level construction jobs.²³ In Minneapolis, greater investments in deconstruction could present similar benefits to lower-skilled workers (for instance through Better Futures Minnesota, a local deconstruction service provider that also offers health counseling, housing, employment, and coaching to men with a history of incarceration, homelessness, poverty, and untreated mental and physical illness).²⁴

Beyond projects on City-owned facilities, the Minneapolis City Council can consider passing an ordinance to require private commercial and residential deconstruction and recycling practices. Orange County, North Carolina requires the recycling of cardboard, clean wood, and scrap metal through its Regulated Recyclable Material Ordinance.²⁵ Since 2016, the City of Portland, Oregon has required manual deconstruction of residential homes built in 1916 or earlier: a study by the Oregon Department of Environmental Quality finds that deconstruction yields a net carbon benefit of approximately 7.6 metric tons of CO₂ equivalent per house compared to demolition.²⁶

Dedicated efforts by the City, unions, and employers may provide basic pre-job training to enhance basic skills and living stipends to participants in order to reduce barriers to entry (for instance, through the On-Ramp Program described above). In this way, energy upgrades and deconstruction projects can provide a direct pathway for new and underserved workers to enter into the clean energy workforce pipeline in the near-term.

3. Enhance the City's inclusive contracting and procurement policies and processes for City-funded projects.

In partnership with employers and contracting firms in Minneapolis, the City should introduce incremental and gradual upgrades to its contracting and procurement policies and processes to promote racial and income equity, access, and inclusion.

Currently, the city's purchasing policies and procedures²⁷ are defined by the following governing ordinances, statutes, and policies:

- The **Target Market Program**, a “race-neutral and gender-neutral” program designed to

²² Connecticut Department of Energy and the Environment, Deconstruction, accessed April 12, 2019. <https://www.ct.gov/deep/cwp/view.asp?q=469620>.

²³ Quinton, S., Instead of Razing Buildings, Some Cities Want to Reuse their Bones, August 2018. <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2018/08/13/instead-of-razing-buildings-some-cities-want-to-reuse-their-bones>.

²⁴ Better Futures Minnesota, Deconstruction, accessed April 12, 2019. <https://betterfuturesminnesota.com/services/building-deconstruction/>.

²⁵ Orange County Solid Waste Management, Regulated Recyclable Material Ordinance, accessed April 12, 2019. <https://orangecountync.gov/933/Regulated-Recyclable-Material-Ordinance>.

²⁶ Nunes, A. et al, Deconstruction vs. Demolition: An evaluation of carbon and energy impacts from deconstructed homes in the City of Portland, March 2019, <https://www.oregon.gov/deq/FilterDocs/DeconstructionReport.pdf>.

²⁷ City of Minneapolis, Governing Ordinances, Statutes, and Policies, <http://www.ci.minneapolis.mn.us/%20finance/procurement/WCMS1Q-003577>.

promote the preservation and expansion of small businesses in the city's marketplace. Contracts that are not anticipated to exceed \$100,000 may be set aside by the city for only approved small business enterprises.

- **Payment of a Living Wage** for services valued at \$100,000 or more.
- **Equal benefits provisions** in contracts for goods or services of \$100,000 or more, requiring contractors to provide to employees with domestic partners benefits equal to those who are married.
- Avoidance of **conflict of interests**.
- **Prevailing wage provisions** for any public improvements;
- The **Small and Underutilized Business Enterprise Program (SUBP)**, which places participation goals on City contracts for women-owned and minority-owned businesses for construction and development contracts in excess of \$100,000.
- **Affirmative Action** provisions.

Through the City's Department of Civil Rights, Minneapolis follows minimum **Construction Workforce Goals** for all construction and development projects exceeding \$100,000 where 20% of the total project trade hours (including those performed by subcontractors) are to be performed by females and 32% by minorities.²⁸ These goals were employed in the City's 2017 Request for Proposals for a Community Solar Garden Development, for which the City plans to be a 20% subscriber. It requires the developer to comply with the City's SUBP participation goals for minority- and women-owned business enterprises and to make a "good faith effort to meet the City's aspirational construction workforce goals."²⁹

The city's existing suite of policies offer a solid foundation to increase job opportunities and economic benefits for workers currently underrepresented in the Minneapolis clean energy workforce. Yet, the continued investments that Minneapolis will need to make in projects on City-owned property present a significant opportunity to realize even greater and more equitable participation rates in the City's clean energy workforce, particularly targeted at individuals and communities experiencing high unemployment rates. For this reason, the City should consider additional strategies to exercise and implement inclusive contracting and procurement practices.

Such strategies may involve prioritizing the use of contractors who meet threshold minimums for female and minority participation; high-level policy setting to address racial and economic inequities through City-owned and -financed projects; priority placement of clean energy projects in disadvantaged and polluted neighborhoods; and improving minority- and women-owned businesses' access and ability to compete in the local bidding process. The tools and resources listed below offer further detail and examples on how to implement such strategies:

- *Philadelphia's Registry of Minority, Woman, or Disabled-owned Businesses*: The City of

²⁸ City of Minneapolis Department of Civil Rights, Construction Workforce Goals, accessed April 12, 2019. <http://www.ci.minneapolis.mn.us/civilrights/contractcompliance/subp/WCMS1P-125075>.

²⁹ City of Minneapolis Finance and Property Services, RFP 2017-22 Community Solar Garden Development, June 2017.

Philadelphia, Pennsylvania aims to fill at least 35% of all contracts through minority, women, or disabled-owned enterprises. For this reason, the Office of Economic Opportunity registers minority-, woman-, and disabled-owned businesses that have been certified by an approved state or city certification agency. Both City- and non-City entities can access the list, creating opportunities for a diverse set of stakeholders.³⁰

- *Prosper Portland's Social Equity Policy*: As the City of Portland's economic and urban development agency, Prosper Portland administers tax incentives, including local tax abatement and state income tax credits, to enable the city to compete with other regions and states for new economic development projects. It uses a "Racial Equity Lens" to examine projects, programs, initiatives and investments and to determine how it can address disparities, advance strategic equity objectives, and decrease unintended consequences.³¹
- *Jobs to Move America's (JMA) Inclusive Procurement Framework*: JMA, a non-profit organization headquartered in Los Angeles, has worked with municipal and state agencies in Atlanta, Chicago, Los Angeles, Massachusetts, Minnesota, and New York to customize the bid and procurement process by examining opportunities in the Request for Proposal (RFP) process; evaluating bidders based on their commitment to diversity and inclusion; engaging product manufacturers and suppliers in providing training and pipelines for disadvantaged workers; and prioritizing the siting of clean energy projects (for instance, electric bus routes) in historically disadvantaged and low-income neighborhoods.³²
- *The Emerald Cities Collaborative's Guidance on Inclusive Procurement and Contracting*: Emerald Cities' signature 2018 report, *Inclusive Procurement and Contracting: Building a Field of Policy and Practice*, presents a number of recommendations that states and cities can pursue as they undertake infrastructure projects. These include assigning a 1% fee on total project costs to support capacity-building of women- and minority-owned enterprises; increasing these businesses' access to new construction standards, skills, and materials through information-sharing and training; and encouraging or requiring large contractors to partner with smaller businesses on project bids.³³

4. **Convene and communicate with unions and employers to encourage inclusive hiring and contracting practices and to align investments and priorities in workforce development, training, and recruitment.**

The City is well-positioned to encourage the area utilities and unions to formalize and/or increase their commitments to local diversity hiring and contracting, as well as to work together to create greater alignment and coordination in training and development opportunities available to Minneapolis job-seekers. Potential leverage points and

³⁰ City of Philadelphia, Business and Self-Employment, accessed April 12, 2019. <https://www.phila.gov/services/business-self-employment/register-as-a-minority-woman-or-disabled-owned-business/>.

³¹ Prosper Portland, Social Equity Policy, November 2017, <https://prosperportland.us/wp-content/uploads/2017/04/Prosper-Portland-Social-Equity-Policy-11.1.17.pdf>.

³² Jobs to Move America, Inclusive Procurement, accessed March 8, 2019, <https://jobstomoveamerica.org/resources/inclusive-public-procurement/>.

³³ Fairchild, D. and K. Rose, Inclusive Procurement and Contracting: Building a Field of Policy and Practice, February 2018. http://files.emeraldcities.org/media/news/Inclusive_procurement_final_03.05.18_3.pdf.

opportunities include:

- **Utility and Other Employer Hiring Practices and Goals:** Interviews with Xcel, CenterPoint, and labor representatives highlighted important steps that large employers are taking to diversify their workforce or membership base. These include internship and apprenticeship programs, mentorships, outreach and recruitment through local academic and community organizations, hiring events and fairs, and tracking of workforce demographics. Many interviewees expressed a willingness and desire to accept more workers from disadvantaged and minority communities, but emphasized the need to maintain safety and performance standards and highlighted the importance of basic skills and worksite awareness training even for entry-level workers.

To demonstrate how they lead by example and to ramp up their efforts, partners such as Xcel, CenterPoint, and major employers (such as large construction or energy firms) should consider establishing a common or coordinated goals framework for diverse hiring and recruitment practices. As an example, energy businesses in the United Kingdom have signed on to an “Inclusion Commitment,” which promotes collaboration, minority and disabled worker representation, and organizational and cultural shifts to attract more female, minority, and disabled workers.³⁴ Transparent goal-setting by these large employers could help kickstart a broader movement that raises awareness of the need for local, diverse hiring practices among clean energy businesses of all of sizes in the City.

- **Xcel’s 100% Carbon-Free Electricity Goal:** In December 2018, Xcel Energy announced plans to reduce carbon emissions 80% by 2030 and to deliver 100% carbon-free electricity to customers by 2050.³⁵ As Xcel develops its roadmap to achieve this goal, the utility would benefit from convening key stakeholders (including labor union partners as well as existing and prospective participants in SUBP) to raise awareness of its planned investments, understand their potential workforce impacts in the City, and plan further investments in pre-job or on-the-job training to ensure there is a sufficient pipeline of workers. Through such convenings, the utility and the City would be able to understand needs on-the-ground and to explore co-investment in development and training (for example, by jointly supporting a coaching program that would assist small- and minority-owned businesses in bidding on competitive contracts with the utility and the City).
- **Utility Franchise Agreements:** The City collects a utility franchise fee from Xcel Energy and CenterPoint Energy in return for their agreement to operate in the city. These fees are collected from customers as a line item on their monthly energy bills. Periodically, the City and utilities negotiate and introduce updates to the franchise agreement through City ordinances; the provisions in these ordinances dictate the ability of the utilities to construct, maintain, operate, and repair utility assets in the right-of-way as well as

³⁴ Energy and Utility Skills Partnership, The Sector’s Inclusion Commitment, accessed April 12, 2019. <https://www.euskills.co.uk/the-sectors-inclusion-commitment/>.

³⁵ Xcel Energy, “Xcel Energy aims for zero-carbon electricity by 2050,” December 2018, https://www.xcelenergy.com/company/media_room/news_releases/xcel_energy_aims_for_zero-carbon_electricity_by_2050.

potential changes or increases to the franchise fee.³⁶ Future negotiations of the franchise agreement between the City and the utilities can include hiring and diversity goals for the utilities, and require routine reporting of progress to the City.

- **Project Labor Agreements:** Through Human Resources, the City has a number of labor agreements in place with unions for city-owned projects.³⁷ Those most relevant to energy upgrades on city-owned properties and lands are with the Minneapolis Building and Construction Trades Council, AFL-CIO for inspectors and journeymen; the International Brotherhood of Electrical Workers (IBEW), Local No. 292, AFL-CIO for electrical technicians; the Minneapolis Foremen's Association; the City Employees' Union, Local Union No. 363, A/W Laborers' International Union of North America, AFL-CIO for laborers; and the Minneapolis Public Works Engineers' Association, among others. Some (though not all) of these agreements appear to have affirmative action provisions requiring or incentivizing the hiring of women, minorities, and other protected class members.

The City should consider working with these union partners to explore the phase-in of incremental and realistic changes to public labor agreements, with the goal of promoting greater participation by minorities and disadvantaged residents in membership and training programs. The Los Angeles County Metropolitan Transportation Authority (LACMTA) Project Labor Agreement and Construction Careers Policy, adopted in 2017, offers a potential model for consideration: this policy encourages contractors on LACMTA- and federally-funded projects in the county to provide construction employment and training opportunities to residents in economically disadvantaged zip codes, with an emphasis on local hiring and female participation.³⁸

- **Conservation Improvement Program (CIP) Implementation:** The CIP is overseen by the Minnesota Department of Commerce's Division of Energy Resources and administered by utilities across the state to help homes and businesses use electricity and natural gas more efficiently. There is an opportunity to integrate inclusive procurement and workforce development best practices into CIP-related activities implemented in Minneapolis. Potential strategies include creating a pre-approved or prioritized list of contractors and implementers for energy efficiency programs and rebates; providing project and program preference for businesses that are minority-owned and -operated; prioritizing local and minority residents in the hiring process; sourcing employees from unions and basic skills and pre-apprenticeship programs; and using sustainable construction and deconstruction practices in their projects.

³⁶ City of Minneapolis, Energy Utility Franchise Agreements, accessed April 12, 2019. <http://www.minneapolismn.gov/energyfranchise/WCMS1P-098834>.

³⁷ City of Minneapolis Office of Human Resources, Labor Agreements, <http://www.minneapolismn.gov/hr/laboragreements/index.htm>.

³⁸ Los Angeles County Metropolitan Transportation Authority, Project Labor Agreement & Construction Careers Policy, accessed April 12, 2019. <https://www.metro.net/about/placcp/>.

Section 2: High-Growth Occupations Supporting Clean Energy in Minneapolis

This section aims to provide an assessment of the high-growth occupations of today or in the near future, including opportunities within the City of Minneapolis enterprise, area utilities, and the interrelated sectors of energy efficiency and energy services management, manufacturing, construction, transportation, wholesale trade, business services, information technology, and cyber security, and estimate the number and types of new positions, salary range, and training needed to access clean energy occupations that are expected to grow in the near-term (by 2019) and medium-term (by 2026).

Policy Drivers Likely to Affect Minneapolis's Clean Energy Workforce

The City's goal of achieving 100% renewable electricity in municipal operations by 2022 and community-wide by 2030 is likely to catalyze dramatic investments in a variety of energy use reduction and clean energy generation projects. By extension, it is also likely to mobilize and make direct use of thousands of local workers who are trained and prepared to support a scale-up in clean energy investments.

The solution set likely to be employed by the City in pursuing its renewable goals includes:

- **Making deep investments in energy efficiency:** Analyses of energy efficiency potential in the City of Minneapolis are unavailable; however, a 2018 state-level analysis suggests that cost-effective energy efficiency potential in Minnesota could decrease forecasted electric load and natural gas load each by 33% by 2029.³⁹ Applied against the City of Minneapolis's 2017 electricity usage (3,815 gigawatt-hours (GWh)⁴⁰), cost-effective electric efficiency investments in the City can reduce load by approximately 1,272 GWh by 2029.⁴¹

Deep retrofits of both residential and commercial buildings will be required to achieve this level of energy savings. In the residential sector, achieving efficiency savings of 33% would avoid approximately 317 GWh of electricity use. The Center for Energy and the Environment estimates that approximately 76,452 homes in the City have significant potential for electric and natural gas energy efficiency, in particular the subset of 52,101 homes built before 1940

³⁹ Center for Energy and the Environment, Optimal Energy, and Seventhwave, Minnesota Energy Efficiency Potential Study: 2020-2029, December 2018. https://www.mncee.org/MNCEE/media/PDFs/MN-Potential-Study_Final-Report_Publication-Date_2018-12-04.pdf.

⁴⁰ Derived from commercial/industrial and residential electric usage estimates reported by Xcel to the Minneapolis Clean Energy Partnership. Minneapolis Clean Energy Partnership, 2017 Annual Report, July 2018. <https://mplscleanenergypartnership.org/documents/>.

⁴¹ Center for Energy and the Environment, Optimal Energy, and Seventhwave, Minnesota Energy Efficiency Potential Study: 2020-2029, December 2018. https://www.mncee.org/MNCEE/media/PDFs/MN-Potential-Study_Final-Report_Publication-Date_2018-12-04.pdf.

(68% of the City's housing stock).⁴²

Deep retrofits in the City's commercial buildings sector can help address the remainder of the target energy savings. As of 2015, Minneapolis's Building Energy Benchmarking program includes 107 million square feet of commercial space.⁴³ Achieving a 37% energy use reduction (which would classify as a "deep" energy retrofit) in this portfolio of buildings could result in approximate savings of 951 GWh.

The Potential Employment Impacts of Deep Energy Efficiency Investments in Minneapolis

- Spending on energy efficiency is very likely to create local job opportunities: the occupations expected to be supported by energy efficiency investments include HVAC technicians, electricians, insulation installers, mechanical engineers, architects, plumbers and pipefitters, retail salespeople, weatherization technicians, and stationary engineers and boiler operators.⁴⁴
- The volume and types of new workers that will be needed to implement cost-effective energy efficiency measures will vary significantly depending on the specific policies, programs, and actions that the City and its partners take, as well as equity and project siting considerations that may affect the cost or scope of projects. (For instance: codes or mandates for energy-efficient and net-zero building and retrofitting will utilize tradespeople and professionals specialized in construction, engineering, intelligent building and metering technologies, and architecture and design. Targeting efficiency improvements in low-income housing may create more opportunities for weatherization technicians. Increasing energy efficiency targets may require the area utilities to increase their personnel in program design and marketing, with cascading effects on staff and contractors who implement these programs. Increasing financial incentives and loan options for energy efficiency retrofits in existing buildings may require an uptick in financial and professional services workers, and may support different occupations based on the targeted participants and available budget.)
- Analyses of the employment impacts of energy efficiency measures are generally expressed in terms of jobs created per million dollars spent. For instance, a 2014 Pacific Northwest National Laboratory (PNNL) study estimates that every million dollars in energy efficiency investment creates 3.99 short-term jobs.⁴⁵
- Assuming a low-end home energy retrofit project cost of \$6,000 per home and a high-

⁴² Nelson, C. and I. Smith, Transforming the Market for Energy Efficiency in Minneapolis: Recommendations for Residential Energy Efficiency Rating and Disclosure, September 2018. https://www.mncee.org/MNCEE/media/PDFs/Mpls-Residential-EE-Disclosure_White-Paper_20180912.pdf.

⁴³ City of Minneapolis, 2015 Energy Benchmarking Report, February 2017.

<http://www.minneapolismn.gov/www/groups/public/@health/documents/images/wcmssp-194743.pdf>.

⁴⁴ Center for Energy and the Environment, Optimal Energy, and Seventhwave, Minnesota Energy Efficiency Potential Study: 2020-2029, December 2018. https://www.mncee.org/MNCEE/media/PDFs/MN-Potential-Study_Final-Report_Publication-Date_2018-12-04.pdf.

⁴⁵ The study authors emphasize that investments to build or retrofit and equip more efficient buildings and improve industrial process productivity tend to be "short-term jobs" supported or created in the construction and production of the installed capital. Anderson, D.M. et al, Assessing National Employment Impacts of Investment in Residential and Commercial Sector Energy Efficiency: Review and Example Analysis, June 2014. https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-23402.pdf

end cost of \$40,000,⁴⁶ energy efficiency retrofits in the 52,101 oldest homes in Minneapolis homes would require a total dollar investment of between \$313 million and \$2.084 billion. For commercial buildings, applying a low-end cost of \$25/square foot and a high-end cost of \$150/square foot⁴⁷ to conduct deep commercial energy retrofits, the total investment required would be between \$2.7 billion and \$16.1 billion. Combined, achieving deep energy reductions in Minneapolis would require an estimated investment in energy efficiency of between \$2.99 billion and \$18.13 billion.

- Applying PNNL’s employment multiplier to the total required investment in Minneapolis for energy efficiency, spending on deep residential and commercial energy efficiency in the City of Minneapolis would need between 11,921 and 72,355 workers.
 - As a point of comparison, according to our data, there are approximately 10,820 energy efficiency workers in Minneapolis; 17,163 in Hennepin County; and 29,968 in the MSA.
- **Drastically increasing distributed, on-site, and community-owned renewable energy generation within the City:** In Minneapolis, the hypothetical upper bound of on-site solar electric potential was estimated in 2014 using Light Detection and Ranging (LiDAR) data to be approximately 773 GWh per year.^{48,49} Based on an average solar PV system performance in Minnesota of 1,233 KWh/KW per year,⁵⁰ generating 773 GWh of solar electricity in a year would require approximately 627 megawatts of installed solar.

Existing solar PV capacity in Minneapolis is estimated to be 9.7 megawatts, based on data provided by Xcel to Frontier Group and Environment America at the end of 2017.⁵¹ This suggests that there is still potential to install an additional 617 megawatts of solar PV in Minneapolis. Of this amount, the *Blueprint for Powering Minneapolis Municipal Operations with 100% Renewable Electricity by 2022* anticipates that solar arrays on city buildings by 2023 will provide 8 GWh per year of renewable electricity to the City, with a total capital cost

⁴⁶ There is a high degree of variation among studies estimating the average cost of home retrofit projects, due to wide variabilities in climate, resident preferences, quality and age of homes, and other factors. The National Renewable Energy Laboratory estimates a “deep” home energy retrofit achieving approximately 47% energy savings, inclusive of electric and natural gas efficiency measures, to cost approximately \$40,420 (Less, B. and I. Walker, A Meta-Analysis of Single-Family Deep Energy Retrofit Performance in the U.S., March 2014. <https://www.osti.gov/servlets/purl/1129577>.) On the low end of the spectrum, a sample group of RESNET Energy Smart Home Performance contractors report that 75% of their projects cost less than \$6,000

⁴⁷ As with residential buildings, the particular strategies used to achieve energy efficiency in commercial buildings may vary depending on the size of the building, dominant process loads (e.g., food service), and other key factors. The high-end and low-end estimates of cost per square foot for deep commercial energy efficiency come from Rocky Mountain Institute, Guide to Building the Case for Deep Energy Retrofits, September 2012. [https://rmi.org/wp-content/uploads/2017/04/Pathways-to-Zero Bldg-Case-for-Deep-Retrofits Report 2012.pdf](https://rmi.org/wp-content/uploads/2017/04/Pathways-to-Zero-Bldg-Case-for-Deep-Retrofits-Report-2012.pdf)

⁴⁸ Slotterback, B., How Much Energy Could Minneapolis Get from Solar?, July 2014. <https://streets.mn/2014/07/21/how-much-energy-could-minneapolis-get-from-solar/>.

⁴⁹ As Xcel has not specifically commented on its capacity to absorb this amount of solar generation within City limits, it is important to note that this estimate is offered to illustrate the significant workforce needs required to achieve the City’s clean energy and climate goals, and may present other legal and technical challenges that are not explored in this report.

⁵⁰ Solar Energy Industries Association, What’s in a Megawatt?, accessed April 12, 2019. <https://www.seia.org/initiatives/whats-megawatt>.

⁵¹ Bradford, A. and B. Fanshaw, Shining Cities 2018: How Smart Local Policies are Expanding Solar Power in America, April 2018. <https://environmentamerica.org/reports/ame/shining-cities-2018-how-smart-local-policies-are-expanding-solar-power-america>.

of up to \$12 million.⁵²

This suggests that the vast majority of on-site solar generation investments will need to occur on non-City property. To achieve this, Minneapolis residents and businesses can receive incentives and participate in net metering arrangements through Solar*Rewards for rooftop solar installations as well as subscribe through Xcel's Solar*Rewards Community program to community solar gardens (though, it is important to note that many of the solar gardens participating in the program are not located directly in Minneapolis but rather all over the state).⁵³

Potential Employment Impacts:

- As with energy efficiency, on-site solar PV projects in and near the City are highly likely to create jobs to which local solar workers could be assigned.
- Community solar installations may also offer job creation opportunities. Xcel's list of Minnesota solar gardens participating in the Solar*Rewards Community program (including those in operation and under development) does not share their exact location or their proximity to Minneapolis⁵⁴; however, it can be assumed that at least a portion of these installations are located within a reasonable commuting distance to the City and therefore can present job opportunities to local clean energy workers and jobseekers.
- The occupations primarily supported by on-site and community solar generation projects are solar installation and repair positions as well as administrative, management, and professional positions.⁵⁵
- It is important to note that employment levels in solar energy can be influenced by many unpredictable factors, including economic conditions, access to capital, major policy shifts at the federal and state levels, and commitments by and changing requirements of energy providers and other major players in the private sector.
- Studies examining the employment impact of solar photovoltaic investments help calculate the approximate number of workers needed to install 617 megawatts of on-site solar generation in the City of Minneapolis.
 - Using the National Renewable Energy Laboratory's Job and Economic Development Impact model, Vote Solar and Environment Colorado estimate that 1,000 megawatts of distributed generation solar in Colorado require 3,333 construction period jobs per construction year and 217 long-term operations and maintenance (O&M) jobs over the life of the project.⁵⁶ Applying this framework to Minneapolis, installing 617 megawatts of solar PV would require 2,056 construction workers per year during

⁵² City of Minneapolis, Blueprint for Powering Minneapolis Municipal Operations with 100% Renewable Electricity by 2022, October 2017. <http://www.minneapolismn.gov/sustainability/buildings-energy/WCMSP-210721>.

⁵³ Xcel Energy, Energy Solutions for Your Home or Business, accessed April 12, 2019. https://www.xcelenergy.com/programs_and_rebates.

⁵⁴ Xcel Energy, Solar*Rewards Community, accessed April 12, 2019. https://www.xcelenergy.com/programs_and_rebates/residential_programs_and_rebates/renewable_energy_options_residential/solar/available_solar_options/community-based_solar.

⁵⁵ The Solar Foundation, National Solar Jobs Census 2018, 2018. <https://www.thesolarfoundation.org/national/>.

⁵⁶ Vote Solar and Environment Colorado, Investing in the Sun: Economic and Environmental Benefits of Developing 1,000 Megawatts of Distributed Generation Solar in Colorado. <https://pscdocs.utah.gov/electric/07docs/07035T14/73267ExhibitA.pdf>.

project construction and 134 total workers to support O&M over the life of the projects.

- Based on interviews with a sample of 30 solar installation and project development companies to examine installer productivity, The Solar Foundation estimates that three installers are needed for every megawatt of non-residential solar and five for every megawatt of residential solar.⁵⁷ Assuming a 2:1 ratio between commercial/industrial and residential solar potential in the city, this would result in 2,262 installers required to achieve 617 megawatts of solar generation.
 - The International Renewable Energy Agency uses an employment factor of four jobs per megawatt (it does not offer detail on its methodology); for Minneapolis, this calculates to 2,468 total workers needed to install 617 megawatts of solar PV.⁵⁸
 - As of 2018, there are 1,373 solar workers in Minneapolis; 3,752 in Hennepin County; and 4,057 in the seven-county MSA.
- **Purchasing renewable energy credits to offset power consumption in the City:** The *Blueprint for Powering Minneapolis Municipal Operations with 100% Renewable Electricity by 2022* anticipates that the City will need to purchase increasing amounts of electricity through Xcel's Renewable*Connect program as well as Renewable Energy Credits (RECs) from new wind and solar projects in the Upper Midwest, for a total of approximately 78 GWh by 2023.⁵⁹

Potential Employment Impacts

- Given the location of these projects, greater investments in RECs would not necessarily support local jobs or require solar workers in or near the City of Minneapolis.
- **Providing electricity customers with renewable power purchasing options:** Currently, Xcel's standard electricity mix is composed of 25% renewable energy, and Minneapolis residents and businesses have the option of increasing their share of renewable electricity by enlisting in various program options, such as Renewable*Connect (which is supplied with energy from Odell Wind Farm and the North Star Solar Project⁶⁰) and Windsource (which is supplied by wind farms located across the state⁶¹).

Potential Employment Impacts:

- As with RECs, investments in these programs would not appear to require local workers

⁵⁷ The Solar Foundation, National Solar Jobs Census 2018, 2018. <https://www.thesolarfoundation.org/national/>.

⁵⁸ International Renewable Energy Agency, Renewable Energy and Jobs: Annual Review 2018, https://irena.org/-/media/Files/IRENA/Agency/Publication/2018/May/IRENA_RE_Jobs_Annual_Review_2018.pdf.

⁵⁹ City of Minneapolis, *Blueprint for Powering Minneapolis Municipal Operations with 100% Renewable Electricity by 2022*, October 2017. <http://www.minneapolismn.gov/sustainability/buildings-energy/WCMSP-210721>.

⁶⁰ Xcel Energy, Renewable Connect for Business – Frequently Asked Questions, accessed April 12, 2019.

https://www.xcelenergy.com/programs_and_rebates/business_programs_and_rebates/renewable_energy_options_business/renewable_connect_for_business/renewable_connect_for_business_frequently_asked_questions.

⁶¹ Xcel Energy, Windsource Minnesota Frequently Asked Questions, accessed April 12, 2019.

<https://www.xcelenergy.com/staticfiles/xs/Marketing/Files/Windsorce-Minnesota-Res-FAQs.pdf>.

due to the distance that would be required to commute to these project locations.

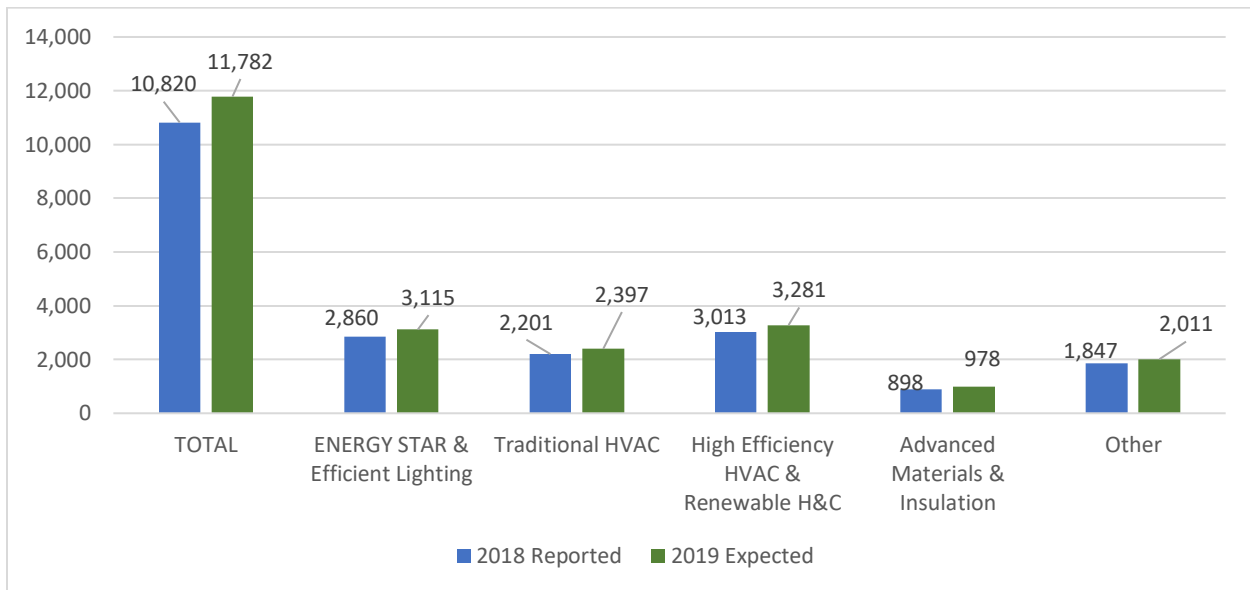
Concurrent with city efforts to achieve 100% renewable electricity community-wide by 2030, in December 2018, Xcel Energy announced plans to reduce carbon emissions 80% by 2030 and to deliver 100% carbon-free electricity to customers by 2050.⁶² In March 2019, Governor Walz announced a proposal to make all electricity providers in the state generate their energy from carbon-free sources and to assist workers and communities affected by the transition.⁶³ By greening Minnesota’s electricity load, these parallel initiatives may assist the City in achieving its renewable electricity and climate goals. But, without direct engagement of the area utilities (for instance, encouraging Xcel and CenterPoint to amplify their efforts in local and diverse hiring, contracting, and procurement), these initiatives may not necessarily support jobs for Minneapolis residents.

Minneapolis Clean Energy Employer Hiring Expectations for 2019

Both the renewable electricity and energy efficiency workforces are expected to increase in size this year. Overall, Minneapolis businesses anticipate having 11,783 energy efficiency workers by the end of 2019 (an increase of 963 workers, or 8.9%, over 2018) and 2,109 renewable energy workers (an increase of 231 workers, or 12.3%, over 2018).

Figures 2-1 and 2-2 below offer a breakdown of the key energy efficiency and renewable energy technology areas in which Minneapolis employers anticipate hiring additional workers in 2019.

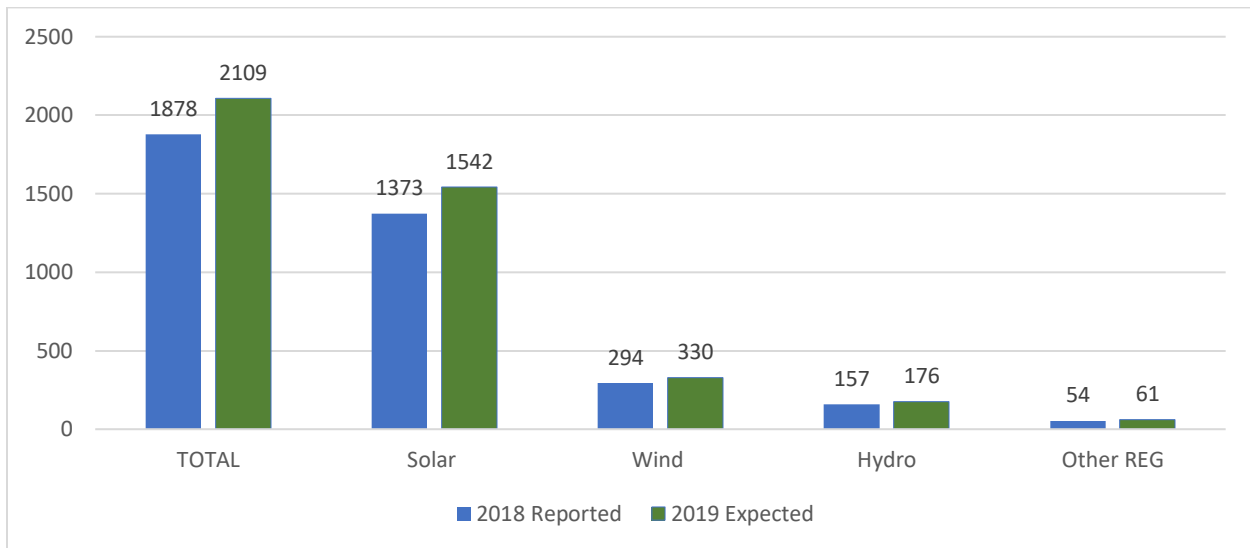
Figure 2-1. Employer Hiring Expectations for 2019 by Energy Efficiency Technology (based on 8.9% growth rate)



⁶² Xcel Energy, “Xcel Energy aims for zero-carbon electricity by 2050,” December 2018, https://www.xcelenergy.com/company/media_room/news_releases/xcel_energy_aims_for_zero-carbon_electricity_by_2050.

⁶³ Minnesota Department of Commerce, “Walz, Flanagan propose plan to achieve 100 percent clean energy in Minnesota by 2050,” March 2019, <https://mn.gov/commerce/media/news/?id=17-374074>.

Figure 2-2. Employer Hiring Expectations by Renewable Energy Technology (based on 12.3% growth rate)



The technologies that are expected to be associated with the largest growth (in terms of total number of new workers) between 2018 and 2019 are:

- **HVAC (including high-efficiency and traditional HVAC as well as renewable heating and cooling technologies) with 464 expected new workers:** The U.S. Bureau of Labor Statistics finds that HVAC mechanics and installers are experiencing high rates of growth both statewide and nationally. Commercial and residential building construction is the primary driver of growth for these occupations.⁶⁴
- **Energy-efficient (namely, ENERGY STAR-labeled) products and efficient lighting, with 255 expected new workers:** Key occupations in this category cover both the production and installation of energy-savings products, as well as the provision of services that reduce end-use energy consumption. Nationally, the majority of employees in these fields work in construction firms, installing or servicing products or performing related services, and another 20% work in professional and business services.⁶⁵ Key occupations supporting energy-efficient technologies, as reported to BW Research by Minneapolis employers, include electricians; plumbers, pipefitters, and steamfitters; carpenters; and construction laborers.
- **Solar generation technologies, with 169 expected new workers:** Nationally, solar generation occupations are concentrated in installation and repair; administration; management and professional positions; and sales.⁶⁶ Occupations supporting solar energy generation in

⁶⁴ Bureau of Labor Statistics, Occupational Outlook Handbook: Heating, Air Conditioning, and Refrigeration Mechanics and Installers, accessed April 12, 2019. <https://www.bls.gov/ooh/installation-maintenance-and-repair/heating-air-conditioning-and-refrigeration-mechanics-and-installers.htm>.

⁶⁵ NASEO and EFI, 2019 USEER, March 2019. <https://www.usenergyjobs.org/2019-report>.

⁶⁶ The Solar Foundation, National Solar Jobs Census 2018, 2018. <https://www.thesolarfoundation.org/national/>.

Minneapolis, as reported to BW Research, include solar PV installers; electricians; plumbers, pipefitters, and steamfitters; sales representatives; and office clerks.

Many of the major occupations supporting energy efficiency and renewable energy are not specific or unique to clean energy projects. Especially in energy efficiency, these fields rely on core technical skills (such as electrical or construction) that can be applied to clean energy. In some cases (for instance, for electricians and plumbers, pipefitters, and steamfitters) workers may be able to transition and transfer their skillset easily between energy efficiency and solar.

Expected Growth, Earnings, and Training in High-Growth Clean Energy Occupations

The tables in Figures 2-3 and 2-4 on the following page provide an estimate, based on Minneapolis employers' hiring expectations for new workers, for specific positions and trades supporting energy efficiency and solar energy generation in the near-term (2019) and medium-term (through 2026).

Notably, there appears to be a correlation between median earnings and the time and effort invested in on-the-job training. This dispels the common perception that clean energy jobs require low-skill levels. In fact, only in limited cases—such as entry-level construction laborer positions—are clean energy jobs readily accessible to individuals with little or no post-high school education or prior work experience.

Figure 2-3. Estimate of Number, Earnings, and Training Needed in High-Growth Occupations in Energy Efficiency in Minneapolis in 2019 and 2026

	Estimated Total Workers, 2018	Estimated New Workers, 2019 ⁶⁷	Estimated Growth Rate, 2016- 2026 ⁶⁸	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required ⁶⁹	Typical On-The-Job Training
Electricians	1069	95	5.9% (1132 by 2026)	\$43.14	High school diploma or equivalent	None	Apprenticeship
Plumbers, Pipefitters, Steamfitters	677	60	13.1% (766 by 2026)	\$41.19	High school diploma or equivalent	None	Apprenticeship
Carpenters	417	37	5.6% (440 by 2026)	\$25.03	High school diploma or equivalent	None	Apprenticeship
HVAC-R Mechanics, Installers	238	21	10.2% (262 by 2026)	\$30.25	Postsecondary non-degree award	None	Long-term on-the-job training
Construction Laborers	236	21	9.7% (259 by 2026)	\$18.23	No formal education credential	None	Short-term on-the-job training

Figure 2-4. Estimate of Number, Earnings, and Training Needed in High-Growth Occupations in Solar Generation in Minneapolis in 2019 and 2026

Occupation	Estimated Total Workers, 2018	Estimated New Workers, 2019 ⁷⁰	Estimated Growth Rate, 2016- 2026	Median Hourly Earnings	Typical Entry Level Education	Work Experience Required	Typical On-The-Job Training
Solar PV Installers	369	51	105% (756 by 2026)	\$22.69	High school diploma or equivalent	None	Moderate-term on-the-job training
Electricians	195	27	5.9% (207 by 2026)	\$44.28	High school diploma or equivalent	None	Apprenticeship
Plumbers, Pipefitters, Steamfitters	123	17	13.1% (139 by 2026)	\$42.29	High school diploma or equivalent	None	Apprenticeship
Sales Reps	43	6	7.6% (46 by 2026)	\$64.67	Bachelor's degree	None	Moderate-term on-the-job training
Office Clerks, General	27	4	-2.4% (26 by 2026)	\$18.85	High school diploma or equivalent	None	Short-term on-the-job training

⁶⁷ Based on a 9% 2018-2019 growth rate for energy efficiency workers, as calculated by BW Research based on Minneapolis employer survey responses.

⁶⁸ Based on Minnesota growth rates projected for 2016-2026 by Projections Central, accessed April 12, 2019. <http://www.projectionscentral.com/Projections/LongTerm>. The 2026 estimates in parentheses are calculated against the 2018 baseline (not 2016, as data are unavailable), and may be slightly inflated. They are included to illustrate long-term employment impacts.

⁶⁹ Defined by the BLS as “work experience that is commonly considered necessary by employers, or is a commonly accepted substitute for more formal types of training or education.”

⁷⁰ Based on a 14% 2018-2019 growth rate for solar energy workers, as calculated by BW Research based on Minneapolis employer survey responses.

Clean Energy Workforce Hiring and Workforce Development Challenges and Opportunities

Despite clean energy employers' optimism that Minneapolis energy efficiency and renewable energy employment will grow over the next year, finding and recruiting qualified workers in both energy efficiency and renewable energy presents a challenge to Minneapolis employers.

In energy efficiency, 39% of surveyed Minneapolis employers indicate that they find it "very difficult" to find qualified applicants; in renewable energy generation, 21% of surveyed Minneapolis employers responded similarly. The most difficult-to-hire-for occupations in renewable energy generation are management, electrician/construction workers, and finance positions or accountants. In energy efficiency, technician or mechanical support and electrician/construction workers follow management positions as the most difficult to hire for.

The most cited reason for such difficulty is lack of experience, training, or technical skills. Competition, insufficient non-technical skills (work ethic, dependability, critical thinking), and insufficient qualifications (certifications or education) are other major reasons why employers report hiring difficulty.

Hiring difficulty is expected to be exacerbated by the dynamics of an aging and retiring workforce, creating more open positions which clean energy employers will need to fill in order to meet increased demand for projects. BW Research's data indicates that an estimated 17.5% of clean energy workers employed by Minneapolis employers are 55 years or older in age. A 2019 report by the Center for Energy and Environment on Minnesota's energy efficiency workforce notes that retirements across many trades in the near- and medium-term may hamper the clean energy economy's ability to keep up with demand and require clean energy employers to recruit younger candidates.⁷¹

NASEO and EFI interviews with stakeholders corroborate some of these trends. The construction trades, which can be physically strenuous and may expose workers to unsafe or hazardous conditions, were identified to have high rates of burnout, and as such tend to experience earlier retirement ages and higher attrition rates than other professions. Processes for hiring in construction are largely informal, particularly because the construction industry is dominated by small businesses (fewer than 20 employees) and relies heavily on networking and referrals from trusted staff and business partners.

Employment in these trades also tends to be seasonal (with project opportunities spiking in warmer weather and waning in cold months) or unpredictable, which presents unique hiring, staffing, and organizational stability challenges. Retention rates in construction firms are often lower than in other industries, and, unlike larger employers, they typically lack internal training and professional development resources to ensure their workers remain up-to-date on cutting edge technologies and standards.

⁷¹ Foshay, E. and B. Steigauf, Minnesota Energy Efficiency Workforce Gap Analysis, March 2019.

<https://www.mncee.org/resources/resource-center/technical-reports/minnesota-energy-efficiency-workforce-gap-analysis/>.

Conversely, stakeholders involved in apprenticeship and training programs expressed a reluctance to increase their intake of trainees, for fear producing more program graduates than there are available jobs.

For large employers (Xcel and CenterPoint), recruiting and attracting new candidates does not appear to present a major concern; however, stakeholders added that retirement and non-retirement attrition rates are on the rise, placing pressure on Human Resources departments to find talent. Increasingly, these stakeholders rely on internship programs; recruitment and engagement of students in college, high school, and junior high school; and events and job fairs to find and train younger staff. Despite these efforts, hiring and retention are especially problematic for remote and field work positions, which have not generally appealed to younger jobseekers.

Many stakeholders noted that companies and organizations with robust internal promotion and growth opportunities tend to have more successful recruitment and healthier retention rates. This is true not only of large energy employers with internal opportunities for lateral and vertical movement, but also of local solar companies, where entry-level workers and installers are presented opportunities to assume design and management roles after demonstrating good performance. These practices may help explain why, from BW Research's data, nearly double the proportion of energy efficiency employers express experiencing difficulty finding qualified candidates (39%) than do renewable energy employers (21%).

Many stakeholders shared their frustration with younger generations' lack of skills and interest in the construction, engineering, and electrical trades. Hands-on skills and knowledge of tools and technology were cited frequently as skills gaps, requiring employers to dedicate additional resources and time to training. Some also highlighted the need for the "industrials arts" to be reintroduced into school curricula and after-school programming, to expose students to these subjects and careers early on.

Notably, almost all stakeholders mentioned that the demographic profile of recent hires and training cohorts are markedly more diverse than that of incumbent workers and past trainees. While some of this change is attributed to concerted efforts by employers and training providers to reach out to minority and younger talent pools, some of it appears to be occurring informally. In construction, for instance, as more workers of Latino, Somali, and Hmong origin enter the local workforce, they may refer work to colleagues and acquaintances in their social and cultural networks. They may also help their employers gain new business with minority-owned companies and households by overcoming cultural and language barriers that a predominantly white or English-speaking operation may not be able to address. Some stakeholders suggested that these positive feedback loops are causing the local workforce to reach a "tipping point" in terms of its ethnic and racial composition, as these informal processes take root and introduce a more diverse worker base to the clean energy economy.

Strategies to Address Hiring and Workforce Development Challenges

These challenges discussed above highlight specific actions that the City and its partners can take

to ease hiring and training difficulties in the clean energy sector:

1. **Co-funding the creation, expansion, and coordination of innovative and effective training programs:** Responsibility for building and honing Minneapolis’s clean energy workforce does not rest exclusively with City agencies. Although the City has assumed a leadership role in setting ambitious climate, clean energy, and economic and racial equity goals, the potential benefits of reaching these targets will be reaped by a wide variety of stakeholders, including residents, businesses, and city, county, and state governmental agencies. Similarly, preparing the workforce to meet energy and climate goals will have multiple benefits, including for employers, unions, and trainers.

In New York, the New York State Energy Research and Development Authority (NYSERDA) oversees a cost-shared program that supports training in energy efficiency and renewable energy technologies funded by the state’s ratepayer System Benefits Fund/Clean Energy Fund. Awardees of the program must demonstrate how their program design meets the needs of clean energy businesses (with priority set for trainers that show direct connections to employers and communities), and they must provide 30% cost share through cash or in-kind services.⁷² This type of competitive grant program offers a model through which a group like the Minneapolis Clean Energy Partnership could co-invest in training programs specifically designed to meet certain criteria, such outreach and engagement of underserved individuals.

2. **Communicating plans for clean energy investment and programming to employers, trainers, and other key stakeholders:** Achieving Minneapolis’s renewable electricity and climate goals will require substantial increases in investment in energy efficiency and renewable energy. Additionally, over the next several years, it is expected that not only the City, but also utilities, private sector partners, and state agencies across Minnesota will invest significantly in new projects, programs, and investments in pursuit of their own clean energy goals.

The City should seize this opportunity to serve as a regular convener of key stakeholders and as a repository of information to track new funding, programs, and projects in energy efficiency and renewable energy in and near Minneapolis. Such coordination and information-sharing would serve multiple purposes, including ensuring that investments towards the City’s renewable electricity goals are aligned with plans at the state level to green the grid. It would also provide crucial a feedback loop for employers in the City to understand upcoming project opportunities and continuously examine the need to adjust, expand, and diversify their own workforce in response.

3. **Enhancing connections and support for small businesses, particularly in construction:** Statewide in Minnesota, Hispanic-owned small businesses make up 13.2% of the

⁷² NYSERDA, Energy Efficiency and Clean Technology Training (PON 3981), accessed May 19, 2019. https://portal.nyseda.ny.gov/CORE_Solicitation_Detail_Page?SolicitationId=a0rt000000MdOBOAA3.

construction industry, and veteran-owned small businesses represent another 18.7% of the sector.⁷³ Providing specific support and connections for these entities can help expand economic opportunities and organizational stability for these stakeholders.

In particular, there appears to be an opportunity to improve coordination among labor union apprenticeship programs, which seek to connect their graduates with jobs in the field, and small businesses, which struggle with workforce hiring and retention. Such a strategy may be initiated by labor unions directly, or potentially could be coordinated in partnership with CPED’s Small Business Team, which assists small businesses in navigating City permitting and licensing processes and connects them to relevant resources and support, or through the Department of Civil Rights’ SUBP.

4. **Advocating for public education reform to increase young people’s exposure to the industrial arts and STEM education:** Many stakeholders highlighted the strain that is placed on employers’ hiring and training systems by the lack of focus on industrial arts and STEM education in public schooling. Employers and unions in particular may be well-suited to engage state and local policymakers on public education reform and to demonstrate the business and economic case for early investments that expose children to technical knowledge and programs.

Linkages with Other Sectors and Emerging Occupations

Energy efficiency and renewable energy occupations are generally tied closely to other major sectors within a municipality’s or state’s economy, such as construction, manufacturing, wholesale trade and distribution, and professional and business services such as consulting, engineering, finance, and legal. USEER survey data for Hennepin County (Minneapolis city-level data is not available), presented in Figure 2-5 below, offers a breakdown of how workers in energy efficiency and renewable energy contribute to major segments of the value chain.

Figure 2-5. Breakdown of Clean Energy Employment in Hennepin County by Key Sector

	Total	Construction	Manufacturing	Trade	Professional Services	Other Services
Renewable Energy	5,514	3,195	486	548	877	407
Energy Efficiency	17,163	10,500	1,725	1,324	3,446	168

Increasingly, clean energy employment opportunities are emerging in other key markets, including in the following areas:

- **Transportation:** Employment in clean transportation technologies cuts across multiple sectors. In the motor vehicles industry, this includes the manufacture; repair and maintenance; wholesale trade and distribution; and professional and business services

⁷³ Small Business Administration Office of Advocacy, Small Business Profile: Minnesota, 2015. https://www.sba.gov/sites/default/files/advocacy/MN_0.pdf.

supporting alternative fuel vehicles (AFVs), including electric vehicles, plug-in hybrids, hybrids, natural gas vehicles, and hydrogen fuel cell vehicles. Employment statistics for the City of Minneapolis are not available; however, AFVs employ 3,340 workers in the state of Minnesota, roughly 10% of all motor vehicle jobs in the state.⁷⁴

Utility and third-party electric vehicle supply equipment providers are increasingly investing in electric vehicle charging infrastructure and storage batteries. Workplace activities supporting the growth of electric vehicles cover scientific research; vehicle manufacture and repair; infrastructure installation and maintenance; and sales and support.⁷⁵ Because this remains a nascent industry, employment studies focused on electric vehicles and charging infrastructure are limited. Accurate data pertaining to the size of electric vehicle-related employment in Minneapolis or Minnesota does not yet exist, but these occupations are generally perceived to be located within utilities or third-party providers that support electric transmission, distribution, and storage.

- **Information Technology (IT) and Cybersecurity:**

The IT sector plays a crucial role in supporting energy efficiency on the grid, in the built environment, and increasingly, between disparate energy assets (enabling communications, for instance, between vehicles and buildings). The Information Technology Industry Council estimates that if the United States were to take advantage of currently available intelligent efficiency opportunities, the U.S. could reduce energy use by about 12–22% and realize billions of dollars in energy savings and productivity gains.⁷⁶ Conversely, IT systems such as data centers can be significant energy users; many large technology companies are utilizing energy efficiency and renewable energy procurement mechanisms in order to offset their environmental impact.

As energy technologies and assets become increasingly integrated with IT, new skillsets and knowledge bases will be required of clean energy workers, particularly to mitigate new vulnerabilities to cybersecurity intrusions and attack. Key workplace activities supporting IT and cybersecurity in clean energy may include a variety of activities, such as data analysis; software, hardware, and database configuration; research and development; machine learning; and implementation of cybersecurity solutions. IT and cybersecurity positions may require a security clearance due to the sensitivity and confidentiality of the work required to be performed, and university degrees or certifications (or both) in computer science and information security are prioritized in the hiring process.⁷⁷ The unique skillsets needed for IT and cybersecurity careers in energy has presented a particularly daunting challenge to

⁷⁴ NASEO and EFI, 2019 Minnesota Energy and Employment Report, May 2019.

⁷⁵ Hamilton, J., Careers in Electric Vehicles, Bureau of Labor Statistics, accessed April 12, 2019. https://www.bls.gov/green/electric_vehicles/.

⁷⁶ Information Technology Industry Council, Intelligent Efficiency, accessed April 12, 2019. <https://www.itic.org/policy/energy/intelligent-efficiency>.

⁷⁷ Ristau Tauchman, E., Cybersecurity Jobs: Everything You Ever Wanted to Know, CompTIA, accessed March 15, 2019. <https://certification.comptia.org/it-career-news/post/view/2018/10/01/cybersecurity-jobs-everything-you-ever-wanted-to-know>.

utilities across the country, who struggle to find qualified candidates.⁷⁸

Because these fields are newly forming, quantitative analyses of IT and Cybersecurity occupations in clean energy do not exist. Yet, interviews with Minneapolis workforce development stakeholders suggest that clean energy employers and training providers are aware of the need to better integrate IT and cybersecurity curricula with energy workforce training initiatives. One stakeholder in particular, Xcel Energy, has developed a six-week program to recruit and train staff in operations and IT staff in cybersecurity practices and protocols, and has opened a Cyber Defense Center in Denver, Colorado.⁷⁹

Section 3: Training Providers

This section includes an analysis and scan of the existing training providers preparing individuals for employment in renewable energy and energy efficiency-related occupations.

The following table (Figure 3-1) describes offerings from training and educational providers in and near Minneapolis that may help prepare individuals for employment in the clean energy field. While some resources are directly related to renewable energy and energy efficiency technology installation, siting, and design occupations, others provide training in basic and core skills that may assist the city in achieving its municipal and communitywide clean energy objectives.

The table does not include on-the-job training or professional development opportunities that Minneapolis clean energy employers may offer for existing employees. Rather, it focuses on academic, training, and career development opportunities that are likely to have broader impacts, such as expanding the clean energy workforce to meet expected new demand for projects and helping individuals develop and grow the skillsets they need to advance and thrive in Minneapolis's clean energy economy.

Because independent evaluations of these training programs are not available, the quality of the programs included in the table is unclear. Yet, this inventory may help illustrate for City agencies, employers, and other workforce development stakeholders the potential training and career development trajectories available to Minneapolis residents seeking to enter clean energy fields.

Overall, Minneapolis and its surroundings appear to have a significant number of training offerings, and a wide selection of options ranging from basic skills and job coaching to intensive academic and apprenticeship opportunities. Yet, an individual unfamiliar with clean energy employment opportunities may have difficulty navigating these options, as very few providers appear to present a turnkey series of programs offering a clear training pathway. Similarly, many programs do not seem to have formal relationships with employers, raising questions about the

⁷⁸ U.S. Department of Energy, Section 2(e): Assessment of Electricity Disruption Incident Response Capabilities, August 2017. <https://www.energy.gov/sites/prod/files/2018/05/f51/EO13800%20electricity%20subsector%20report.pdf>.

⁷⁹ NASEO and EFI, 2019 USEER, March 2019. <https://www.usenergyjobs.org/2019-report>.

ability of these training opportunities to result in sustainable and family-sustaining employment for graduates. This presents an opportunity for CPED to educate Minneapolis job-seekers on training opportunities in the City (as discussed in Section 1) and/or for co-funders of training grants (as proposed in Section 2) to encourage greater coordination among existing training providers and with industry employers.

Finally, while some training programs and facilities are located in the inner metropolitan area, those with high career advancement potential (such as apprenticeships enabling workers to reach journey-level in their trade) are located in areas that require driver's licenses, vehicles, and sufficient time to commute. In some cases, a driver's license is a requirement of participation. This may pose a barrier to entry, particularly for low-income or disadvantaged individuals.

Figure 3-1. Energy Training and Education Providers in and near Minneapolis

Type of Offering(s)	Provider/ Program	Location(s)	Target Sector(s)	Features Relevant to Energy Workforce Development
Academic Program	Century College (Contact: Scott Randall, scott.randall@century.edu)	White Bear Lake	Applied Design; Arts & Humanities; Health Sciences; Human Services; Industry; STEM; Social and Behavioral Sciences	Century offers credits for HVAC-R technology courses as well as the Associate in Applied Science Degree, which prepares students for work in coal fired electric power generation, natural gas distribution, ethanol production, biodiesel production, wind turbine maintenance, and/or solar energy.
Academic Program	Dunwoody College of Technology (Contact: Bridget Reynolds, breynolds@dunwoody.edu)	Minneapolis	Arts/Sciences; Automotive; Business; Computer Technology; Construction Sciences & Building Technology; Design and Graphics; Engineering	Dunwoody's Construction Sciences and Building Technology and Engineering programs provide a targeted suite of courses over one or two years in such fields as architecture; electrical construction and maintenance; HVAC installation; and electrical and manufacturing engineering.
Academic Program	Minneapolis Community and Technical College School of Trade Technologies (Contact: n/a)	Minneapolis	Aircraft Maintenance; HVAC and Refrigeration; Welding and Metal Fabrication; CNC Machinist	The School of Trade Technologies offers programs in HVAC and Refrigeration; CNC Machinist; and Welding and Metal Fabrication. The HVAC-R program offers additional training in solar energy PV and thermal solar technologies.
Apprenticeship - Construction	Laborers International Union of North America Laborers Training Center (Contact: Kevin Pranis, kpranis@liunagroc.com)	Lino Lakes	Construction	The LIUNA Construction Craft Apprenticeship Program combines classroom education with on-the-job training. Each apprentice must complete 288 hours of training and 4000 work hours over a three-year period.
Apprenticeship - Electrical	National Electrical Contractors Association and Local Union 292 International Brotherhood of Electrical Workers Minneapolis Electric Joint Apprenticeship Training Committee (Contact: Chris Kohn, CKohn@ibew292.org)	St. Michael	Electrical	This apprenticeship program consists of on-the-job training (with apprentices working full-time with a contractor) and classroom and lab education. The facility includes 13 labs covering solar, logic controllers, motor controls, transformers, instrumentation, applications, and pipe bending. Applicants must commit to attending classroom and lab training one day a week for 30 weeks per year, and must have a driver's license, high school transcript, and pass physical, drug, and aptitude tests. This program prepares apprentices for a career as an IBEW Journeyman Electrician. Tuition is free of charge.
Apprenticeship - Insulation	Insulators Local 34 of the International Association of Heat and Frost Insulators and Asbestos Workers Apprenticeship Program	St. Paul	Mechanical Insulation	The Local 34 four-year apprenticeship program combines classroom teaching with on-the-job training to introduce apprentices to careers as mechanical insulators. Apprentices dedicate 156 hours a year to a professional curriculum in focus areas (installation, material layout, job specs, and reading blueprints). Apprentices must also work with expert mechanical

	(Contact: Diana Slotness, diana@insulators34.net)			insulators throughout their apprenticeship, and are paid for their on-the-job training. Pre-apprentice candidates must work a minimum of 160 hours in the field as a permit helper and must undergo an interview and skills assessment.
Pre-Apprenticeship; Training - Electrical	Summit Academy OIC (Contact: Tameeka Gamble, tgamble@saoic.org)	Minneapolis	IT; Construction; GED; Healthcare	Summit Academy's 20-week Pre-Apprentice Carpentry Training introduces students to basic tools, building and designing schematics, blueprint reading, and other industry practices to enter a career in construction. Its Electrician Training (also 20 weeks) teaches pipe bending electrical circuitry, residential and commercial wiring; print reading, and other industry practices.
Training	Avivo Institute of Career and Technical Education (Contact: Kelly Matter, kelly.matter@avivomn.org)	Minneapolis, St. Paul, St. Cloud	Computer and IT; Manufacturing, Maintenance, and Warehouse	The Institute offers industry-specific career education and technical training programs. Graduates earn industry credentials. Course length ranges from 3 weeks to 6 months. "Enhancement" courses help participants build technical skills in their existing work and "First Step" courses are for those with no or little work experience.
Training	Twin Cities RISE (Contact: Deborah Brown, dbrown@twincitiesrise.org)	Minneapolis, St. Paul	Facilities and Maintenance; Customer Service and Call Centers; Advanced Manufacturing	RISE offers 8-week career training programs during which participants are matched with a career coach; paid internships with partner organizations; and a "Career Pathways" program that include empowerment training, 21st century skill-building, one-on-one coaching, and sector-specific training through employer engagement.
Training - Basic Skills; Training - Manufacturing	EMERGE (Contact: Mike Wynne, wynnem@emerge-mn.org)	Minneapolis	Manufacturing; Instrument Tech; Welding; GED Attainment	EMERGE provides basic GED education; "Manufacturing Foundations" training; and Advanced Manufacturing training through Hennepin Technical College.
Training - Energy Efficiency	Minnesota Energy Resources Authorized Insulation Contractor Program (Contact: Phil Anderson, panderson@mncee.org)	Minneapolis, St. Paul	Energy Efficiency	The Center for Energy and Environment (CEE) provides a suite of resources, including in-person training and online courses, for contractors who provide high-quality insulation and air sealing services to their residential customers.
Training - Solar	Midwest Renewable Energy Association Solar Training Academy (Contact: Jenny Heinzen, jennyh@midwestrenew.org)	Minneapolis, St. Paul	Solar Photovoltaics	MREA's Solar Training Academy offers a series of weekend classes covering PV fundamentals, site assessment practices, and design principles and considerations. Upon completion, students qualify to sit for the NABCEP PV Associate Exam.
Training and Coaching	Better Futures Minnesota (Contact: PJ Hubbard, pjhubbard@betterfutures.net)	Minneapolis	Deconstruction; Warehouse Safety; Appliance Recycling; Janitorial Services; Snow and Lawn Care Equipment Training and Maintenance	BFM works with men with a history of unemployment, homelessness, and other conditions to provide training and workforce development services, in addition to housing and coaching services.

Section 4: Engaging Partners, Stakeholders, and Communities

This section offers recommendations for engagement among city, county and state workforce development organizations, training partners, and high-growth employers and industries. It also offers recommended approaches to community outreach and engagement to recruit, train, and retain underserved and disadvantaged Minneapolis residents.

Synthesis of City and Partner Engagement and Intervention Strategies in Clean Energy Workforce Development

Achieving the Climate Action Plan will require deep and substantial investments in energy efficiency and renewable electricity generation (particularly on-site solar energy) between now and 2030. Our data suggests that the current workforce in Minneapolis, particular in energy efficiency, may not be sufficient in size to meet the drastic growth in clean energy projects needed to achieve 100% community-wide renewable energy by 2029. Additionally, in both the energy efficiency and renewable energy industries, the demographic composition of the workforce underrepresents people of color and racial and ethnic minorities, and unemployment in the City is particularly concentrated in low-income, minority neighborhoods; this presents a challenge to the City's efforts to achieve greater income and racial equity. Finally, clean energy employers report difficulty hiring and retaining candidates qualified and trained in the technical and non-technical skills needed for clean energy occupations; especially as increasing numbers of clean energy workers approach retirement age, these difficulties are likely to intensify.

These dynamics present the City with an opportunity to encourage and cultivate networks for engagement and coordination across a variety of clean energy workforce stakeholders. Although city resources and budgets are likely to limit the depth and breadth of engagement, there are clear opportunities for high-priority, high-impact intervention and partnership-building that can leverage existing City partnerships and resources, rather than require entirely new initiatives or resources.

The table below (Figure 4-1) summarizes recommendations and strategies from previous sections of this report and proposes key lead and support roles and actions to drive positive change toward a more equitable clean energy workforce and economy in the City of Minneapolis.

Figure 4-1. Synthesis of Key Recommendations, Strategies, and City/Partner Responsibilities

Recommendation/Strategy	Lead Role(s)	Secondary or Support Role(s)	Metric(s)
Section 1 Recommendation: Increase disadvantaged residents' participation in and access to the clean energy workforce.			
<p>Strategy 1A: Develop a turnkey “On-Ramp” Program to engage underserved and minority job-seekers.</p>	<ul style="list-style-type: none"> - City/CPED: Ensure CPED staff are well-versed in clean energy occupations, careers, and training partners. Leverage existing CPED programs to help adult and youth job-seekers understand and navigate training options and programs. Continuously engage job-seekers to track interest and suitability for clean energy fields. - City/Sustainability: Identify opportunities in the Clean Energy Partnership Work Plan to connect On Ramp Initiative graduates with employment and projects. 	<ul style="list-style-type: none"> - CPED Training Partners: Expose On Ramp Initiative participants to clean energy and sustainability principles, technologies, and practices. - Clean Energy Partnership and other energy employers: Express willingness to consider and accept On Ramp Initiative graduates for new and open positions. 	<ul style="list-style-type: none"> - Number and diversity of job-seeking residents connected with clean energy training and employment opportunities.
<p>Strategy 1B: Pair solar generation projects in city-owned properties with energy efficiency and sustainable practices in deconstruction and recycled materials use.</p>	<ul style="list-style-type: none"> - City/Sustainability: engage City property managers and decision-makers to raise awareness of energy efficiency opportunities and payback. Where demolition is being considered, raise awareness of deconstruction costs and benefits. - City/Finance: Examine finance and property services to explore how energy efficiency and building deconstruction/recycling can be more effectively integrated into City solar and construction projects. 	<ul style="list-style-type: none"> - City Council: Consider ordinance encouraging or mandating residential and/or commercial building deconstruction practices. 	<ul style="list-style-type: none"> - Number and employment impacts of clean energy projects in City-owned facilities. - Increased use of deconstruction and building recycling, including embodied energy, carbon, and employment impacts.

Recommendation/Strategy	Lead Role(s)	Secondary or Support Role(s)	Metric(s)
<p>Strategy 1C: Enhance City’s inclusive procurement and contracting processes.</p>	<ul style="list-style-type: none"> - City/Civil Rights: Deliver targeted financial and technical assistance to existing and prospective participants of SUBP to help them compete more effectively in City project bidding process. Cultivate relationships between large firms and small/minority businesses to encourage partnering on bids and projects. - City/City Coordinator: Ensure principles of Strategic and Racial Equity Action Plan are fully integrated into City procurement policies and practices. 	<ul style="list-style-type: none"> - City/Sustainability: Where feasible, encourage siting of clean energy investments in disadvantaged and minority neighborhoods. 	<ul style="list-style-type: none"> - Quantity and quality of assistance to SUBP participants. - Participation of small- and minority-owned businesses in City bids. - Siting of clean energy projects directly funded or indirectly supported by the City.
<p>Strategy 1D: Encourage employers to adopt inclusive hiring and contracting processes.</p>	<ul style="list-style-type: none"> - Utilities, other large energy employers: commit to common goals framework and coordination on local and minority hiring. Consider public, transparent goal-setting process through an “Inclusion Commitment” to lead by example. - Xcel – Convene City, labor unions, SUBP participants and prospects, state policymakers (Commerce, Governor’s Office) to discuss effort and plans supporting 2050 goal. - City/Human Resources: Engage labor unions on incremental and realistic changes to drive greater participation by minorities and disadvantaged residents. - CIP Program Implementers: Incentivize inclusive workforce development and hiring principles by creating and using a list of pre-vetted contractors and committing to diversity standards. 	<ul style="list-style-type: none"> - Sustainability: Encourage and participate in dialogues and discussions. 	<ul style="list-style-type: none"> - Employer participation and implementation of inclusive hiring practices. - Coordination of City, utility, and state efforts in support of clean energy and climate goals. - Exploration and implementation of changes to Project Labor Agreements between City and unions. - Use of minority- and women-owned and small businesses in CIP-supported programs.

Recommendation/Strategy	Lead Role(s)	Secondary or Support Role(s)	Metric(s)
Section 2 Recommendation: Pursue targeted strategies to address key hiring and workforce development challenges.			
<p>Strategy 2A: Communicate ramp-ups in energy efficiency and renewable energy investments and programs to employers and trainers.</p>	<ul style="list-style-type: none"> - City/Sustainability: Track and hold regular convenings with CPED, employers, unions, training providers, and relevant state offices (Commerce, Governor) to 100% Renewables Goals progress and planning. 	<ul style="list-style-type: none"> - CPED, employers, unions, training partners, state agencies: Based on information provided by Sustainability, examine need and opportunities to adjust, expand, and diversify workforce. 	<ul style="list-style-type: none"> - Coordination of City, utility, and state efforts in support of clean energy and climate goals.
<p>Strategy 2B: Build business case for City, employer, and trainer co-investment in training program expansion</p>	<ul style="list-style-type: none"> - Clean Energy Partnership: Establish a competitive grant program to increase training pathways for clean energy careers. 	<ul style="list-style-type: none"> - Training providers: Co-invest (through grant cost-share) and demonstrate market need for proposed training pathways. - Employers: Partner with training providers to provide learn-and-earn and job placement for trainees. 	<ul style="list-style-type: none"> - Program participation and co-investment.
<p>Strategy 2C: Enhance connectivity and support for small businesses, particularly in construction.</p>	<ul style="list-style-type: none"> - Labor Unions: cultivate relationships with small energy efficiency and renewable energy businesses to support placement of apprentices in firms that typically experience difficulty with workforce hiring and retention. 	<ul style="list-style-type: none"> - City/CPED or City/Civil Rights: Support coordination through relevant small business services and programs (Small Business Team and/or SUBP). 	<ul style="list-style-type: none"> - Formal and informal partnerships created. - Increased placement of union apprentices in small businesses.
<p>Strategy 2D: Engage state and local policymakers on public education reform for the industrial arts and STEM subjects.</p>	<ul style="list-style-type: none"> - Employers, unions: form advocacy coalition to engage state and local policy makers and academic institutions on curriculum changes. 		<ul style="list-style-type: none"> - Creation of programming to exposure schoolchildren to STEM and industrial arts.

Target Community and Resident Engagement Strategies

The City possesses significant communications and convening power, with inroads into disadvantaged neighborhoods (for instance, through the Green Zones program) as well as access to energy sector employers and training providers in and around Minneapolis. For this reason, it is well-positioned to promote resident education and awareness of clean energy career pathways and opportunities.

Opportunities available to the City to engage low-income, disadvantaged, and minority community members include:

1. Serving as a trusted convener and source of information on clean energy training and career pathways and success stories:

As discussed in Section 1, the City can utilize existing collaborations like the Clean Energy Partnership to encourage the adoption of local and inclusive hiring practices, co-investment in skills-building and training programs, and the sourcing of qualified candidates from disadvantaged neighborhoods. Established relationships with energy employers, training providers, and local labor unions could help build confidence among community groups and residents that clean energy training and education will result in family-sustaining career opportunities.

The CPED and Sustainability websites offer an important platform by which the City can amplify and communicate this message further. Potential content on clean energy careers can include information on core occupations and skillsets in the clean energy workforce; their connection to issues of importance (such as infrastructure modernization, climate change, and local economic opportunity), and an inventory of training providers and partners in and near the City.

For instance, in parallel with the agency's adoption of its Project Labor Agreement and Construction Careers Policy, the Los Angeles County Metropolitan Authority website offers information and infographics on "Steps to a Construction Career," a "Women in the Trades" Resource Guide, and a "Female Participation Scorecard" assessing how many of its prime contractors have attained the female participation goal of 6.9% in construction projects.⁸⁰

In New York City, the YouTube channel of the Department of Citywide Administrative Services includes a video series featuring "NYC Heroes in the Basement," which spotlights different building energy efficiency and facilities management problems and the O&M employees who resolve them.⁸¹

⁸⁰ Los Angeles County Metropolitan Transportation Authority, Project Labor Agreement & Construction Careers Policy, accessed April 12, 2019. <https://www.metro.net/about/placcp/>.

⁸¹ New York City Department of Administrative and Citywide Services, NYC Heroes in the Basement, accessed April 12, 2019. <https://www.youtube.com/playlist?list=PLeKJZEgWFwrpR-b7M0RT9fHYgNkz949cZ>.

2. **Ensuring City agencies regularly involved in employment, training, and City contracting opportunities (such as CPED and Finance and Property Services) cultivate and maintain relationships with organizations representing disadvantaged communities and individuals in the City:**

City agencies should keep current email lists to ensure that project and training opportunities are communicated effectively, and in particular can make use of Sustainability's network of Green Zones partners to provide targeted engagement and relationship-building.

Similarly, the City can connect employers and training providers with community groups and partners, to encourage the advertisement of job, training, and educational opportunities to organizations representing underserved and disadvantaged communities and individuals.

Section 5: Inclusion and Equity Opportunities in Clean Energy Financing

This section offers suggestions and best practices in inclusive clean energy financing to advance economic opportunity for underserved communities and populations.

A City-supported financing program could have significant impact on the local workforce by drawing sustained visibility and investment to energy efficiency and renewable energy projects, and could signal to employers that these fields represent a market opportunity around which to build their teams of staff and contractors. For instance, Property Assessed Clean Energy (PACE) programs are estimated to have created approximately 13,400 jobs nationwide in the commercial sector (approximately 15 jobs per million dollars invested) and 42,000 in the residential sector.⁸²

Inclusive financing programs should be designed to support workforce and economic development for low-income and underserved communities and populations. For instance, program administrators may consider adapting inclusionary procurement, contracting, and hiring principles to their financing program structure. This may involve, for example, selecting local contractors with specific hiring targets and commitments and prioritizing project siting and location in historically disadvantaged geographic areas and neighborhoods, as described in Section 1 of this report.⁸³

Some clean energy financing programs offer a comprehensive suite of services to support uptake by underserved segments of the market. Elevate Energy's Multifamily Energy Efficiency Program is commonly heralded as a successful "one-stop-shop" model that has enabled owners and tenants of low-income housing to undertake and benefit from energy efficiency. Each prospective borrower in the program is assigned an energy advisor who conducts a full-service

⁸² PACENation, Market Data, accessed March 8, 2019, <https://pacenation.us/pace-market-data/>.

⁸³ In addition to the Jobs to Move America framework cited in Section 1, the Emerald Cities Collaborative offers guidance on Inclusive Procurement and Contracting policies and practices: <http://emeraldcities.org/media/news/inclusive-procurement-and-contracting>.

energy assessment, identifies cost-effective measures, and provides ongoing project oversight throughout construction. The program channels multifamily property owners to the Community Investment Corporation, which provides low-interest and low-fee capital for the projects.⁸⁴

Another best practice in inclusive financing is to engage targeted communities and individuals and their advocates early in the program design process. For instance, this engagement may help program administrators understand the unique perspectives and challenges of underserved individuals in legal and consumer issues, such as whether the financing program should be able to disconnect utility service in response to late or missed payments, contractor vetting, and potential recourse if they misrepresent the program or potential paybacks, use of unionized labor, and costs and fees incurred by borrowers, among others.⁸⁵

Regardless of the structure or specific features of a financing program, education and awareness-raising are critical factors in its success. Data collected for a study in California suggest that non-white, low- and middle-income, non-college educated, and non-English-speaking households are under-represented in terms of their participation not only in low-cost financing programs, but also in the state's low-income grant programs. Its findings conclude that "untargeted energy efficiency programs, those offered to everyone and designed for no one in particular, result in a participant population that is not representative of the general population. Untargeted programs leave several identifiable groups underserved," and recommends that designers of financing programs considering either *targeting* or *tagging* their programs. Targeted programs are designed to facilitate participation by a specific population, but do not restrict access by other segments. Conversely, tagged programs restrict participation based on specific characteristics.⁸⁶

It is recommended that the City and its partners examine the program costs and benefits of the best practice strategies described above. In particular, integrating inclusive strategies, comprehensive technical and financial services, and targeting underserved borrowers may add administrative and other costs. It is crucial to understand these costs, who bears them, and their potential impacts on already-disadvantaged households.

⁸⁴ Elevate Energy, Multifamily Energy Efficiency, accessed March 8, 2019. <https://www.elevateenergy.org/programs/multifamily-energy-efficiency/>.

⁸⁵ National Consumer Law Center, State of New York Public Service Commission Case 07-M-0548, December 2008, https://www.nclc.org/images/pdf/energy_utility_telecom/obf/WGVI-On_Bill_Financing_Final_Report.pdf.

⁸⁶ California Energy Commission, Who's Participating and Who's Not: The Unintended Consequences of Untargeted Programs, June 2016, https://efiling.energy.ca.gov/URLRedirectPage.aspx?TN=TN211734_20160607T141453_Who%27s_Participating_and_Who%27s_Not_the_unintended_consequences_o.pdf.

Conclusions and Next Steps

This Workforce Development Assessment examines the number, occupations, and skills of the Minneapolis clean energy workforce. It sources data and information from the 2019 USEER; national, state, and local best practices; and stakeholder discussions to unpack opportunities, challenges, and trends in clean energy workforce development, with a particular focus on the City's ambitious renewable energy, energy efficiency, and racial and income equity goals.

Recommended next steps that we believe can be accomplished in the near-term, by administrative or executive action by the City, include:

- Communicating plans and programs to scale-up investments in clean energy in pursuit of the City's climate and energy goals, so that employers, labor unions, and training providers can plan and adjust their services, staff, and contractor base accordingly.
- Leveraging existing City employment and training pathways and programs to present disadvantaged and underserved residents with an "on-ramp" to clean energy occupations.
- Encouraging City agencies to pursue projects that integrate solar, energy efficiency, and other sustainable practices such as building deconstruction and materials recycling.
- Serving as a trusted convener and source of information on clean energy training and career pathways.
- Cultivating and maintaining relationships and continuous engagement with organizations representing disadvantaged communities and individuals in the City.

Recommended next steps that may require longer-term coordination, investment, new programming, and/or significant commitment by the City and key workforce stakeholders (employers, unions, training providers, and others) include:

- Designing new programming that enhances inclusive contracting and procurement policies for City-funded projects (i.e. by offering technical and financial assistance to support small, minority-owned, and women-owned businesses).
- Encouraging inclusive hiring and contracting policies among Minneapolis-based utilities, employers, and clean energy program administrators and implementers.
- Co-investment in training program expansion among the Clean Energy Partnership, unions, and local training providers.
- Emphasizing the need for public education reform to exposure young residents to STEM and the industrial arts.
- Examining ways an inclusive financing program in the City can ensure economic and employment returns for disadvantaged and underserved residents.

Growth in the energy efficiency and renewable energy sectors presents an opportunity for the City, workforce development partners, and employers to realize a more equitable local clean energy economy and create economic opportunity for underserved and disconnected residents. Such a future will not be achieved using business-as-usual practices, but rather will require coordination and investment by a wide range of committed partners.