

Winter 2021

Detroit Solar Toolkit

Jobs and Training



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Our Team

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Career and Education Opportunities in Solar

The adoption of solar PV by Detroit citizens increases economic activity and creates an opportunity for inclusive economic growth and jobs for minority contractors and communities. Resources and programs are available to learn more.

For example, if you are an interested member of a faith-based institution, there are presentation materials available from organizations like Michigan Interfaith Power and Light (MIPL). There are membership opportunities that offer presentations, field trips, and informational guides about environmental and climate justice, global warming, church energy conservation management, and solar financing for houses of worship. There is also a bulk purchasing program where you can purchase outdoor solar lighting and streetlights through the PowerUp program offered by Ryter Cooperative Industries.

There are several local opportunities for alternative training on residential electricity and renewable technologies that include solar technologies. Many of these opportunities are offered through organizations found across all parts of Detroit. Listed below are just a couple of the programs available for education and training in the areas of energy and other related trades. A resource table can be found in Appendix C of this toolkit for educational programs in Detroit, Southeast Michigan, the Midwest, across the United States, and online for renewable energy and related technology educational training.

The Youth Energy Squad

The Youth Energy Squad (YES) grows the next generation of green leaders by engaging young people in hands-on, place-based projects that make their homes, schools, and communities more sustainable for everyone. YES supports students in



making connections between STEM concepts, career pathways, and sustainability and justice issues in their communities. Young people are positioned as experts and leaders in developing and executing a project and develop not only a better understanding of important concepts such as energy and water justice, but also grow as public speakers, facilitators, and project managers. The goal of the Youth Energy Squad is to help young people recognize the power of their voice and passion and to seek to make collaborative, just, and sustainable change in their communities, now and throughout their lives.

Walker Miller Energy Services



Walker Miller Energy Services (WMES) has worked with the Detroit Area Pre-College Engineering Program (DAPCEP) for the last four years to offer a class on energy efficiency and renewable energy for high school juniors and seniors interested in entering into STEM careers. These classes expose Detroit youth to energy fundamentals, as well as provide exposure to various industry professionals that can speak to their experiences in the clean energy economy.

City of Detroit

Detroit Skilled Trades Employment Program: Under the new Detroit Skilled Trades Employment Program (STEP), the City of Detroit is partnering with local unions and their Joint Apprenticeship Training Committees (JATC) to set annual goals that increase the percentage of membership. Finding and training electricians that understand solar PV is an important new skill that future employers will need.



Growth Trends And Projections For Solar Jobs

The forecasting of job projections and creation numbers in Illinois and Minnesota may shed some light on potential trends in Michigan.

Shifts would need to be made in Michigan energy policy that are similar with respect to community solar, virtual net metering, outflow rate-incentives, and solar carve-outs for behind the meter distributed generation systems. If the trends are similar, as indicated in the figure below, there is a strong possibility of real and sustained employment for workers entering the field. The three scenarios that are referenced in Figure 1 were modeled as Scenario 1: 12.5% by 2019; Scenario 2: 15% by 2021; and Scenario 3: 30% by 2027.

In Figure 2, the jobs projections are based on Michigan achieving 30% renewables by 2027 matching the goal DTE has established of 30% renewables by 2030. This scenario is the most likely scenario to evaluate. This study uses input-output analysis to assess the economic impact of renewable energy construction and generation activities on Michigan's economy utilizing the Jobs and Economic Development Impact (JEDI) model developed by the National Renewable Energy Laboratory (NREL) and MIG Inc.'s IMPLAN models to estimate the regional impact of construction, operation, and maintenance activities associated with renewable energy sources. The analysis in the report generated simulated economic results for 2017 to 2027 scenarios with state legislative changes in the current Renewable Portfolio Standard for Michigan along with new MPSC mandates for distributed generation. Job years are calculated based on an assumption of 2,800 hours and includes all renewables such as solar, biomass, wind, hydroelectric water, and landfill gas.¹ Most of the jobs that would meet any new or more ambitious and progressive Renewable Portfolio Standards (RPS) would be generated through wind, followed by solar. The solar projections, however, could rapidly shift with one change in the distributed generation regulations for the Investor Owned

Utilities (IOUs).

	Scenario 1	Scenario 2	Scenario 3
	12.5% by 2019	15% by 2021	30% by 2027
Gross Economic Impact	\$3.8 billion	\$6.3 billion	\$10.3 billion
Job-Years Supported	20,100+	32,500+	68,500+
Employee Compensation	\$1.4 billion	\$2.2 billion	\$4.5 billion

Figure 1 Results of Modeled Renewable Energy targets of 12.5%, 15%, and 30%²

Impacts	Job-Years	Earnings (in Millions \$)	Output (in Millions \$)
Construction			
Direct	12,553.2	\$1,165.9	\$1,520.5
Indirect	18,633.2	\$1,069	\$3,193.3
Induced	13,687.9	\$695.0	\$2,008.0
Operation and Maintenance (over lifetime of technology)			
Direct	9,647.3	\$790.1	\$973.6
Indirect	8,261.2	\$526.5	\$1,717.3
Induced	5,797.9	\$297.4	\$878.2
Total	68,580.8	\$4,544.4	\$10,290.9

Figure 2 Modeled Economic Impact of 30% Renewables Scenario by 2027)³

Although it is difficult to quantify the potential in Detroit for renewable energy jobs associated with PV deployment, any targeted efforts would be a net positive for the underemployed, veterans, or at-risk youth as a path toward more stable opportunities in associated skill trades, energy efficiency, or other sustainable career endeavors.

¹ "Growing Michigan's Economy & Jobs: Economic Impact of Renewable Energy, 2017-2027." MICEF Renewable Portfolio Study Update 2018, The Hill Group Commissioned by Michigan Conservative Energy Forum, <https://static1.squarespace.com/static/544676b0e4b08bb8e7627c06/t/5b34fbd0aa4a993c622a744e/1530199250989/hillstudy>.

² "Growing Michigan's Economy & Jobs: Economic Impact of Renewable Energy, 2017-2027." MICEF Renewable Portfolio Study Update 2018, The Hill Group Commissioned by Michigan Conservative Energy Forum, <https://static1.squarespace.com/static/544676b0e4b08bb8e7627c06/t/5b34fbd0aa4a993c622a744e/1530199250989/hillstudy>.

³ "Growing Michigan's Economy & Jobs: Economic Impact of Renewable Energy, 2017-2027." MICEF Renewable Portfolio Study Update 2018, The Hill Group Commissioned by Michigan Conservative Energy Forum, <https://static1.squarespace.com/static/544676b0e4b08bb8e7627c06/t/5b34fbd0aa4a993c622a744e/1530199250989/hillstudy>.

Potential for Detroit

The adoption of solar PV by Detroit citizens increases economic activity and creates an opportunity for inclusive economic growth and jobs for minority contractors and communities. It is important to state that this assessment did not attempt a deep analysis of the potential for real jobs created based on increased solar deployment in the City of Detroit. What it did attempt to do is gather insights from solar developers and community organization representatives to consider how increased activity in solar development would attract positive job creation. Some strategies discussed include the following:

- Any successful solar workforce program must be “employer driven”; solar deployment firms should work in partnership with workforce programs.
- Solar workforce training is only as strong as the solar market; improving state and

local solar deployment policies will increase opportunities for workforce development.

- Community groups indicated they support solar PV projects in their neighborhoods if the residents have access to the benefits of solar (e.g., utility bill savings); education and job creation from solar need to be made available directly to residents in the neighborhoods in which solar is installed.

The suggestions of education, demonstration, and integration” provided at the second charrette offer a pathway to embedding projects around the city that could generate sustained long-term opportunities. The model below demonstrates how the process of educating residents begins with the process of employment and career development by “getting people in the conversation where they are.”

Collaboration with educational partners and programs through the employment of the solar co-op model (Milwaukee)

Each community should have demonstration houses that show the utilization of weatherization, energy efficiency, and solar PV

Supporting development of smart-neighborhoods showing integrated smart energy practices via the “Solar PV Deployment Blueprint”

**Project-Based
and Apprentice
Employment**



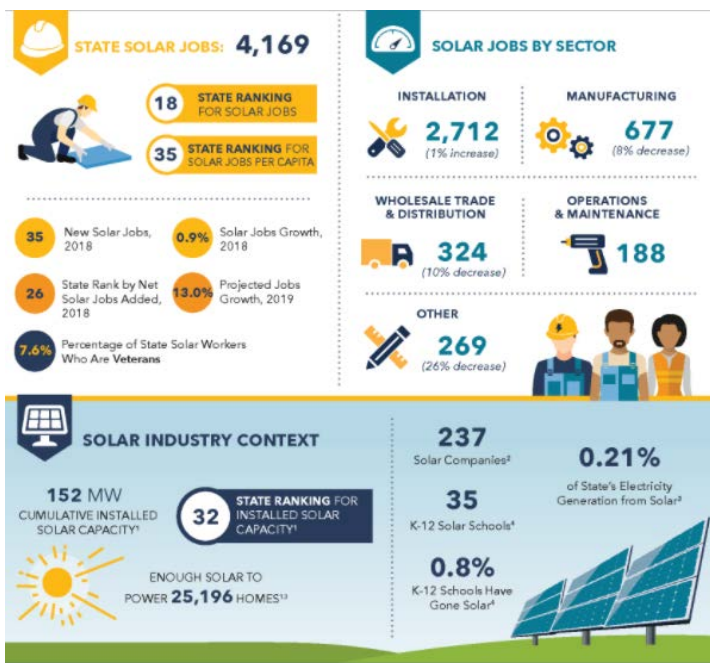


Figure 3 The Solar Foundation Job Census for Michigan 2018 ⁴

While maintaining a Midwest focus on how solar job trends may impact Michigan and Detroit, Minnesota can be considered a model state with Illinois being a close approximation as a newer state legislating less restrictive solar distributed generation policy

When the overall impact is considered (comparing job creation in the fossil fuel economy versus the green economy), there is a net job gain for the short- and mid-timeframe. This does not include the accompanying operations and maintenance

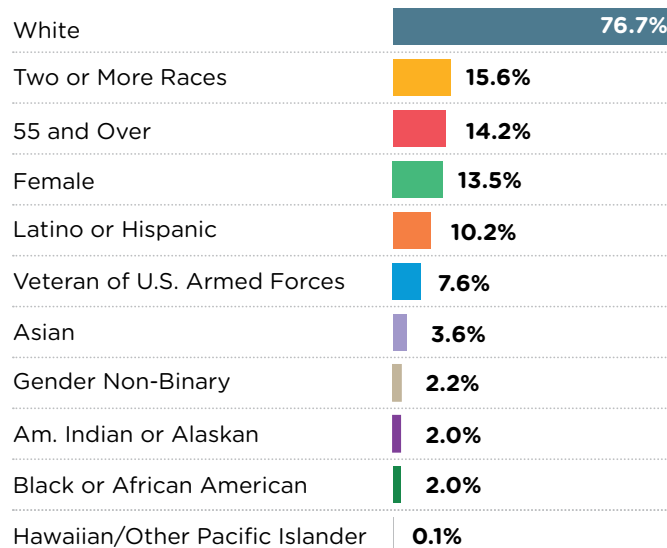


Figure 4 Michigan Solar Workforce Demographics for 2018 ⁵

employment tied to long-term renewable energy investment. The workforce demographics for Michigan suggest that Detroit may possess an underutilized demographic of African-American residents who could be employed for solar projects and that veterans represent the third largest group in Michigan. Also interesting to note is that Figure 4 indicates that women are a well-represented and viable group that could be part of larger STEM programming associated with Detroit Public Schools as a concentration for energy-related career paths.

⁴ "Solar Jobs Census 2018: Michigan." *The Solar Foundation*, <https://www.thesolarfoundation.org/solar-jobs-census/factsheet-2018-mi/>.

⁵ Solar Jobs Census 2018." *Solar Jobs Census 2018*, The Solar Foundation, <https://solarstates.org/#state/michigan/counties/solar-jobs/2018>.

Existing Training Programs

While there may only be a small market for solar in Detroit at the current time, solar education and vocational training is a valuable skillset that can be coupled with many of the traditional trade programs. For those not familiar with the solar PV ecosystem, please see the Solar Careers Map.⁶ It will help individuals, city officials, job training program directors, and non-traditional technical training organizations understand the comprehensive and fully integrated paths that can be taken by those seeking to enter into the energy and solar industry. Further, the Solar Careers Network, a national workforce program led by the Solar Foundation and funded by the DOE's Solar Training and Education for Professionals (STEP) program, can also aid the solar industry through workforce development and support for high quality, cost-effective solar technology deployment.

Solar raises people up in several ways and all are important: reducing energy costs in the long-run, having community solar located in neighborhoods, and creating jobs that have the potential to pay a living wage for solar workers in the city.”

—Detroit Solar Feasibility assessment participant

There are several local opportunities for alternative training on residential electricity and renewable technologies like solar. These are offered through organizations found across all parts of Detroit. Listed below are some of the programs available for education and training in the areas of energy and related technologies.

Youth Energy Squad: The Youth Energy Squad (YES) supports students in making connections between science, technology, engineering, and math (STEM) concepts, career pathways, and sustainability and justice issues in their communities.

Detroit Area Pre-College Engineering Program: Walker Miller Energy Services has worked with the Detroit Area Pre-College Engineering Program (DAPCEP) for the last four years to offer a class on energy efficiency and renewable energy to high school juniors and seniors

interested in STEM careers. These classes expose Detroit youth to energy fundamentals, as well as provide exposure to various industry professionals that can speak to their experiences in the clean energy economy.

Detroit Skilled Trades Employment Program: Under the new Detroit Skilled Trades Employment Program (STEP), the City of Detroit is partnering with local unions and their Joint Apprentice Training Committees (JATC) to set annual goals that increase the percentage of membership. Finding and training electricians that understand solar PV is an important new skill that future employers will need.

Certifications and Third-Party Credentialing

The National Association of Board Certified Energy Practitioners (NABCEP) is currently the largest and most widely recognized third-party organization offering a pathway to credentialing for individuals in the solar industry.

Detroit IBEW Local 58

The International Brotherhood of Electrical Workers (IBEW) Local 58 offers a federally recognized training path for those interested in a residential wireman three-year program. Individuals will have the comprehensive foundation of an electrician upon graduation, so that they can readily complete a NABCEP certification in PV installation or complete courses to gain the PV-specific content.

Operations and maintenance, inspections, and future microgrid work could be just a few of the ancillary support positions needed as solar industry continues on a growth path. The Interstate Renewable Energy Council (IREC), in partnership with the Solar Instructor Training Network and the Office of Energy Efficiency & Renewable Energy SunShot Prize program, published a six-part best practices online guide, Exemplary Solar Education and Training Programs, that highlights notable solar education training programs.⁷ A common theme found in over half of the programs reviewed is an alliance between existing two-year programming content, skilled trade unions, and contractor associations.

⁶ <https://www.irecsolarcareermap.org/>

⁷ “Solar Energy Education and Training Best Practices: The Series.” IREC, <https://irecusa.org/workforce-education/training-resources/best-practices-the-series/>.

Henry Ford College ⁸

Program Highlights:

- Distinguish the full range of renewable energy technologies and their applications.
- Describe how mechanical components of renewable energy technologies that are economically relevant work (wind, solar PV, solar thermal, batteries, geothermal, small hydropower, fuel cells, alternatively fueled vehicles, and biomass).
- Demonstrate basic principles of electrical repair and installation while employing appropriate safety measures.
- Demonstrate the installation, maintenance, and repair of small wind generators, solar PV, solar thermal hot water systems, basic biomass combustion systems, and above-ground components of geothermal systems following manufacturer specifications.
- Compare and contrast the environmental impact and economic role of both traditional and alternative energy supplies.
- Perform building energy audits for residential and commercial buildings.
- Perform energy efficient upgrades to building envelopes, HVAC equipment, and controls.
- Describe and apply mechanical, building, plumbing, electrical, and energy codes, standards, local ordinances, and state and federal regulations

Community College Training

Macomb Community College

The Renewable Energy Technology Certificate at Macomb provides the knowledge and skills required for positions involving the integration of renewable energy applications in a variety of business and industrial environments. The certificate focuses on a “holistic” approach, emphasizing the importance of scientific principals coupled with industrial processes, professional proficiencies, and practical laboratory experiences.

Wayne County Community College

The Renewable Energy Technology program is designed to provide students with the theoretical knowledge necessary for a career in energy management and renewable energy technology fields, with special emphasis on solar panel (PV) installation. Students acquire and-on skills in installation, operation, repair and replacement of related equipment. The program prepares students to pursue careers in the renewable energy field through coursework focused on sol and wind energy production and usage.

“Solar needs to be made sexy to a younger generation. This needs to be done in a very culturally relevant way” -Detroit Solar Feasibility assessment participant

The Detroit Training Center

The Detroit Training Center offers ancillary training in construction and heavy equipment, an area that could see a related increase in activity with local contractors supporting smaller sites as they are cleared or graded for PV deployment. The Detroit Skills Trade Training Program and the Operating Engineers are two more programs that indirectly cultivate highly skilled workers for wide scoping projects in which solar and storage, geothermal, or green infrastructure are involved. Customized training programs are just one of the capabilities that the Detroit Training Center can facilitate.

A key discussion topic in the assessment was the importance of training programs that are associated with accreditations that are reflective of the state. Another focus was on federal funding for existing job readiness or training programs. Detroit Job Corps Center and Randolph Career Technical Center are two programs that would pair well with a range of young students interested in solar readiness programs.

⁸ “Solar Energy Education and Training Best Practices: The Series.” IREC, <https://irecusa.org/workforce-education/training-resources/best-practices-the-series/>.

Employment and Training Opportunities

Solar PV Education and Certificate Programs

School/Training Center	Location	Duration	Program Type	Certificate	Residential Wiring	# of Classes/Cred.	(A.A.S. Degree)	Tracks
Detroit Electrical Industry Training Center: IBEW Local 58	Warren, MI	5 year	Apprenticeship	✓	✓			
Heatspring	Online	Varies	Free and Paid	✓				Solar, Green Building, Renewable HVAC, Microgrid, Other Technologies
Henry Ford College	Dearborn, MI	2 year	Energy Technology - Alternative Energy			66 credits	✓	
Hudson Valley Community College	Troy, NY	2 year	Occupational Studies in Electrical Construction Maintenance	✓		420 hours	✓	Photovoltaic Installation
Lane Community College	Eugene, OR	2 year		✓	✓	970 hours	✓	Renewable Energy Technician, Energy Management Technician
Lawrence Tech University	Southfield, MI	Varies	Energy Engineering					
Midwest Renewable Energy Association (MREA)	Custer, WI	Varies			✓			
Macomb Community College (MCC)	Warren, MI	2 year	Construction Technology - Renewable Energy Specialist	✓			✓	
NC State University Clean Energy Center	Raleigh, NC	Varies	Renewable Energy Technologies	✓		4 courses		
Michigan Operating Engineers 324	Bloomfield Township, MI	5 year	Apprenticeship	✓				Construction, Stationary
Randolph Vocational Technical Center	Detroit, MI	High School	Skilled-Trades	✓	✓			Electrical, Carpentry, CAD, HVAC, Masonry, Plumbing and Fitting
Solar Energy International (SEI)	Panoia, CO			✓				
University of Michigan	Ann Arbor, MI		Energy Systems Engineering					
Wayne State University (WSU)	Detroit, MI	2 year	Alternative Energy Technology		✓	62 credits	✓	
Wayne County Community College (WCCC)	Detroit, MI	2 year	Renewable Energy		✓	62 credits	✓	

Renewable Energy and Trade Associated Organizations

Solar PV Workforce, Credentialing & Trade Associations

Organization	Location	Focus Area	Certifications	Testing
American Solar Energy Society	Boulder, CO	Advocacy, Education, Resources, Policy		
Electronics Technicians Association (ETA)	Greencastle, Indiana	Electric Vehicle Technician (EVT) Photovoltaic Installer (PV1) Small Wind Installer (SW1)	✓	✓
Michigan Energy Institute	Ann Arbor, Michigan	Advocacy, Research		
Grid Alternatives	Oakland, California	PV Workforce Training	✓	
IBEW Local 58	Detroit, Michigan	Electrical Trades	✓	✓
International Renewable Energy Coalition (IREC)	Latham, New York	Resources, Policy		
Operating Engineers 324	Bloomfield Township, Michigan	Operating Engineers Trades		
National Association of Board Certified Energy Practitioners (NABCEP)	Clifton Park, New York	PV Energy Credentialing	✓	✓
National Renewables Energy Laboratory (NREL)	Washington, DC and Golden, CO	Research, Resources		
Solar Training Network	Department of Energy (DOE)	Resources, Advocacy		
Solar Energy Industries Association (SEIA)	Washington, DC	Advocacy, Resources, Trade Association		
Solar United Neighbors	Washington, DC	Advocacy, Resources,		
The Solar Foundation	Washington, DC	Advocacy, Resources, Policy		