

2011

California Green Innovations Challenge Renewable Energy Labor Market Study, Report 4

Automated Machinist in Clean Energy Manufacturing



SolarTech

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6/24/2011

Vision without Action is Daydreaming.

Action without Vision is Wandering.

Vision with Action is Destiny.

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California Green Innovations Challenge Renewable Energy Labor Market Study, Report 4

Renewable Energy Labor Market Analysis Automated Machinist in Clean Energy Manufacturing

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DISCLAIMER

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Preface

The California Labor & Workforce Development Agency (LWDA) is the only agency in state government coordinating labor and employment programs for workers and businesses. Within the LWDA, the California Employment Development Department (EDD) offers a wide variety of services to Californians under the Employment Service, Unemployment Insurance, State Disability Insurance, Workforce Investment, and Labor Market Information programs.

The EDD provides labor market information to employers, job seekers, and others, including policy makers, economic developers, economists, and planners. Its programs provide job search workshops, referral to education, training, and supportive services to help keep employers, employees, and job seekers competitive.

Within the LWDA and the EDD, the Green Innovation Challenge grants are designed to encourage industry leaders to collaborate with workforce development organizations and find innovative methods to determine the workforce needs of businesses (by characterizing the labor market), identify actions to address priority industry needs in commercialization and application processes, and integrate/align actions into an overall collaborative strategy. The objectives are to fill immediate employment needs as well as develop a partnership and infrastructure flexible enough to support employment growth for up to 10 years.

The grants will encourage business-led partnerships in a number of counties to develop the most creative methods of accelerating talent development to serve increasing employment specialties within the green economy. The programs offered will support the development of a highly-trained workforce with the critical skills required for jobs in the following clean tech sectors:

- Renewable energy generation
- Energy efficient buildings
- Alternative and renewable fuels
- Efficient vehicles
- Energy storage
- Efficient water use

Contact information for the main Employment Development Department (EDD) is available at http://www.edd.ca.gov/About_EDD/Contact_EDD.htm

Initial GIC solicitation announcement: <http://gov.ca.gov/press-release/15245/>

GIC award press release announcement: <http://www.labor.ca.gov/pdf/nwsrel10-04.pdf>

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From SolarTech and the SolarTech Workforce Innovations Collaborative (SWIC)

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SolarTech would like to thank Mike Appio, Department Head of the Manufacturing & CNC Technology program, for his valuable insight on the CNC market.

SolarTech also recognizes the valuable contributions of its Workforce Committee Chairmen Justin Bradley, Principal of Bradley Consulting and SolarTech's SWIC Project Manager, and Rick Kuhn, Director of Economic & Resource Development at Foothill-De Anza Community College District. Their leadership during the past three years has defined the vision and scope of this grant through their work with the Committee.

SolarTech values its collaboration with its SWIC partners the North Valley Job Training Consortium (NOVA), specifically Executive Director Kris Stadelman, Program Manager Laura Caccia, and Workforce Development Analyst Shonda Ranson, as well as Catherine Ayers, SWIC Project Director at Foothill-De Anza Community College District (FHDA).

Key Acronyms

GIC, Green Innovations Challenge, a California state 2010 grant initiative

LWDA, California Labor and Workforce Development Agency

FHDA, Foothill-De Anza Community College District, Los Altos Hills, Calif.

NOVA, North Valley Job Training Consortium, Sunnyvale, Calif.

SWIC, SolarTech Workforce Innovations Collaborative, which includes SolarTech, NOVA and FHDA.

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1. Executive Summary

The objective of this research is to estimate labor demand for positions related to Computer Numerical Control (CNC) in manufacturing sectors such as contract manufacturing and machine shops that serve solar and other clean energy industries. The study provides qualitative descriptions of the skills, education, and experience required for the positions and identifies leading clean energy-related employers for automated machinist talent.

There is a small but growing demand for CNC machinists in the Bay Area associated with the renewable energy industry. The study reports of a total of 203 automated machinist-related jobs listed in the region over a one-month period ending May 14th. Of these, there were 36 jobs at 19 companies that either work directly in the clean energy sector or serve clients in the sector.

Various other types of jobs were advertised in this field during the same time period. The “CNC Machinist” title represents an umbrella category which may include many sub-functions such as Programmers, Set-Up Machinists, Operators, Deburr Operators and Tool Crib Attendants. The following list ranks jobs by frequency of postings:

- 34% - CNC Machinist
- 14% - CNC Programmers
- 12% - CNC Operators
- 9% - CNC Set-Up

The study highlights interesting characteristics pertaining to employer requirements for professional experience and educational achievement: while about 40% of the positions prefer at least five years of experience, an equal percentage of postings did not specify any experience requirement at all. Almost 80% of the positions do not state an educational requirement. Employers either are seeking untrained or inexperienced staff or they are not being sufficiently specific in their advertisements. Interviews with trainers and hiring employers confirm that automated machinist work is highly specialized and requires at least some level of training or some level of on-the-job experience.

Our findings indicate that training resources can be allocated to CNC professional development in support of the clean energy sector. The De Anza College Department of Manufacturing and Computer Numerical Control Technology provides machining and manufacturing education and training with courses, certificates, and degrees in CNC-related disciplines. We recommend placing 10 to 15 individuals in this program who have previous machinist experiences and who seek upgraded skills training.

2. SolarTech Workforce Innovations Collaborative (SWIC)

SolarTech Workforce Innovations Collaborative (SWIC) -- a partnership of SolarTech, the North Valley Job Training Consortium (NOVA) and the Foothill-De Anza Community College District (FHDA) -- was awarded a \$4 million grant in July 2010 as part of the Green Innovations

Challenge. This workforce development group was created through the leadership of SolarTech’s Workforce Committee to prepare the Bay Area to meet the labor needs of the burgeoning and fast-changing clean-tech industry over the next two years.

SWIC’s mission is to identify the immediate and mid-term unmet workforce needs of the solar industry. Through its unique model, SWIC is connecting job seekers, educators and employers to better align labor supply and demand.

The ultimate goal: To leverage real-time market intelligence and create educational programs providing the *right* type of training at the *right* time so that 245 regional workers can be trained and placed in renewable energy jobs.

SWIC provides the common ground between industry (led by SolarTech), displaced workers (NOVA), and training organizations (FHDA). Frequent and systematic information exchange between these three entities is key to the success of this two-year program.

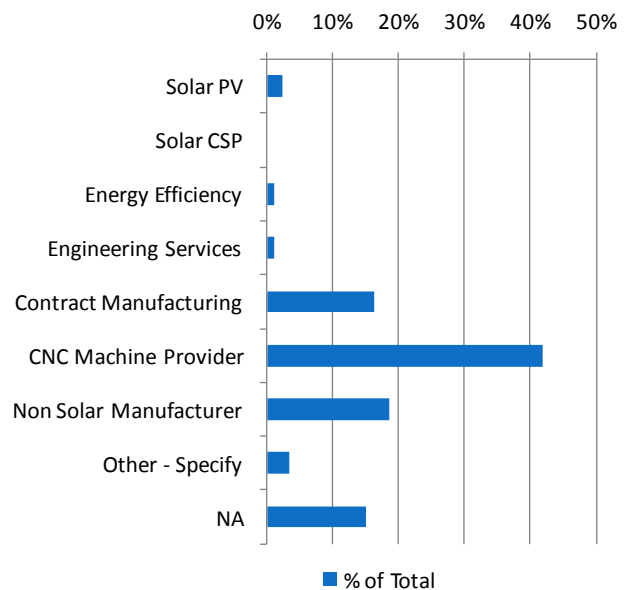


3. Overall Demand for CNC Talent

The study was conducted using two online job boards: Craigslist and simplyhired.com. A total of 203 CNC-related job postings were found over a one-month period ending May 14th. It should be noted that of the 203 positions, 53 postings came from a single firm that provides staffing services.

The demand for CNC talent comes primarily from CNC machine providers (i.e. machine shops). Contract manufacturers and manufacturers of non-clean energy products represent the second most important source of employment. Three companies in the solar and clean energy sectors had CNC-related opportunities.

Industry Segments



4. Employers of CNC Talent Associated with Clean Energy

We identified 203 job postings by 60 Bay Area employers within 100 miles of Sunnyvale. Nineteen of the 60 companies, or 32%, either work directly in the clean energy sector or serve clients in the sector (see 19 companies listed below). Because demand for machine shops and contract manufacturers is cyclical, firms that have served clean energy clients in the past are included in this list. The following companies offered 36 positions during the study period.

Company	Source	# Postings	Segment	City
Bayside Solutions	SimplyHired	8	Staffing	Pleasanton
Sanmina-SCI	SimplyHired	4	Contract Manufacturing	San Jose
Benchmark Electronics	SimplyHired	4	Contract Manufacturing	Concord
K-Fab, Inc	Craigslist	3	CNC Machine Provider	Santa Clara
Vander-Bend	Craigslist	3	Contract Manufacturing	Sunnyvale
Quality Quartz Engineering, Inc.	Craigslist	2	CNC Machine Provider	Newark
Mass Precision	SimplyHired	2	CNC Machine Provider	San Jose
United Mechanical Inc.	Craigslist	1	CNC Machine Provider	Hayward/Castro Valley
Southbay Solutions	Craigslist	1	CNC Machine Provider	Palo Alto
Haig Precision Mfg. Corp.	Craigslist	1	CNC Machine Provider	Campbell
Samax Inc	Craigslist	1	CNC Machine Provider	Sunnyvale
Standard Metal Products	Craigslist	1	CNC Machine Provider	San Francisco
Unitech Tool & Machine, Inc	Craigslist	1	CNC Machine Provider	Santa Clara
Inverse Solutions, Inc.	Craigslist	1	Contract Manufacturing	Alameda
GEK Gasifier	Craigslist	1	Clean Energy	Berkeley
Belectric Inc.	Craigslist	1	Solar PV	Fremont
West Coast Quartz	Craigslist	1	Solar PV	Fremont
True Tech	Mike Appio	NA	Contract manufacturing	Fremont
Greenbit	Contact	NA	CNC Machine Provider	Milpitas

5. Leading Functions

Phase 1 of the study provides in-depth analysis of the 86 postings that appeared on Craigslist. These listings were gathered using the broad search term “CNC” to capture the largest possible number of postings.

The “CNC Machinist” title represents an umbrella category which may include many sub-functions such as Programmers, Set-Up Machinists, Operators, Deburr Operators and Tool Crib Attendants. When employers do not specify a sub-function in the job posting, the posting is included as part of the general CNC Machinist category. This methodology is suitable for training purposes because the term “Machinists” represents a broad set of skills.

Thirty-four percent of the demand for automated machinist workers fell into the overall category of “CNC Machinist,” while 14% were listed as CNC Programmers, 12% as CNC Operators, and 9% as CNC Set-Up.

5.1. CNC Machinist Knowledge, Experience & Skills

Knowledge

- Overall machining practices: Tool geometry, application, speeds and feeds
- Fixtures and tooling design and modification
- Mathematics, handbook formulas, and precision measuring
- Blueprint and drawing interpretation
- Measurement tool reading

Experience

- Setup and operate one or more of the following machines: CNC lathe and mill, drill press, or secondary equipment
- Ensure parts meet tolerance specifications
- Secondary operations, including deburring
- Perform preventive maintenance of equipment
- Document tool changes for CNC programming review

More than 40% of the positions require at least five years of experience, while 20% require less than that. About 40% of the postings did not specify experience requirements.

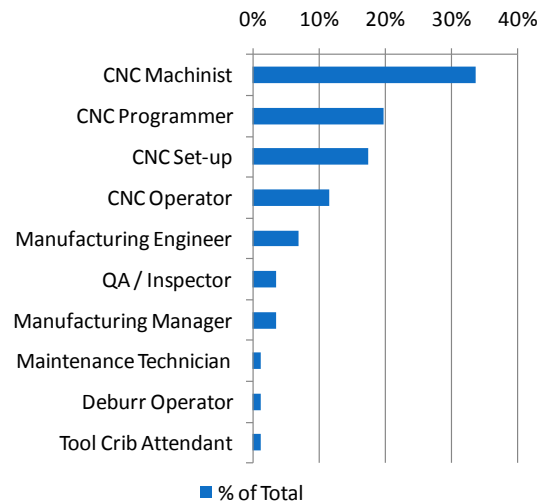
Education

- Almost 80% of the positions did not state an educational requirement

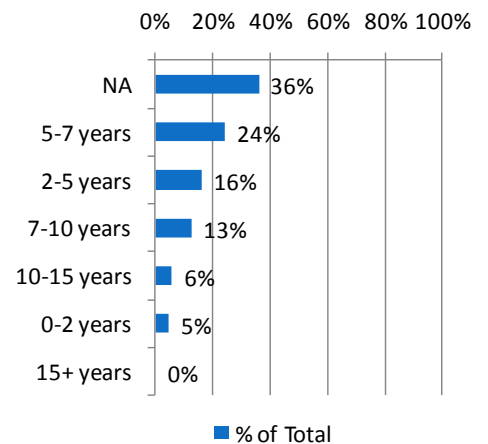
Skills

- Conceptual Skills
- Process Improvement
- Functional and Technical Skills
- Controls and Instrumentation
- Tooling

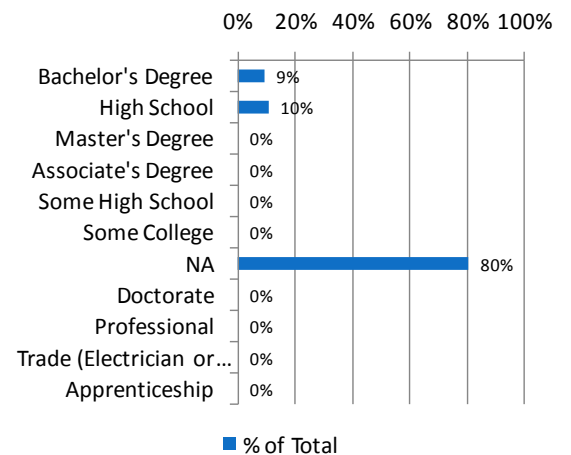
Function



Experience



Education



- Coordination
- Inventory Control

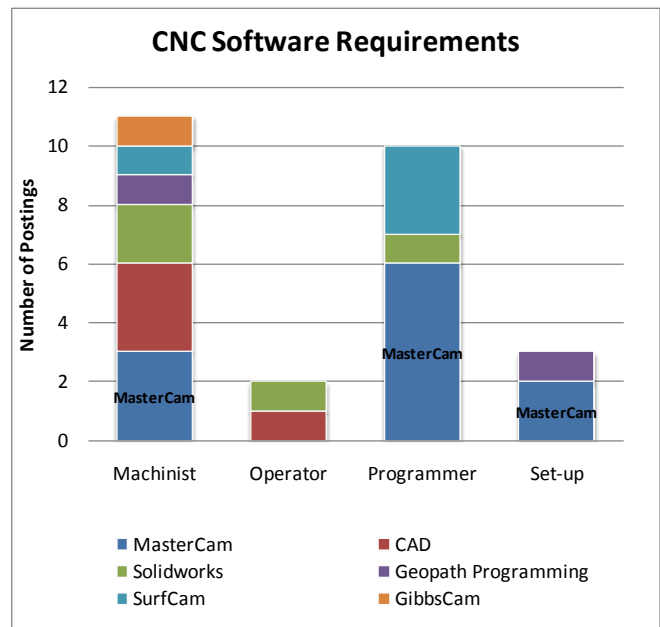
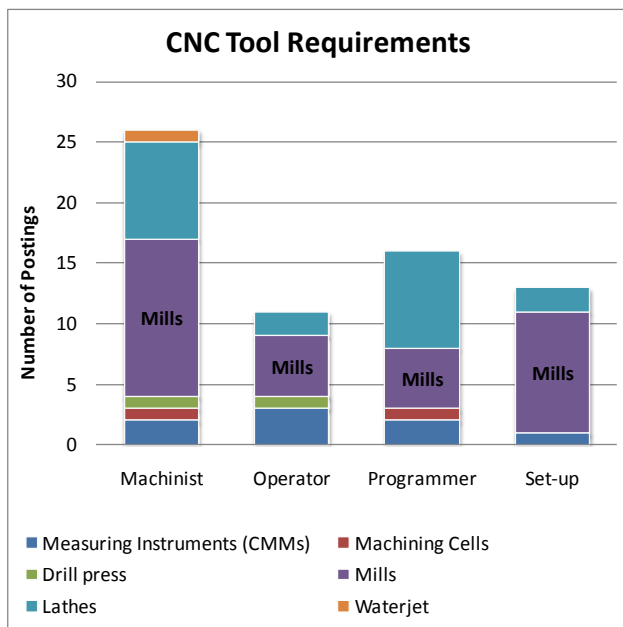
Soft Skills

- Communicate in English, both written and verbal
- Work in a professional, team-oriented environment
- Great attitude
- Able to work overtime as required

Tool and Software Specific Skills

Specific tool and software requirements were noted whenever they were listed to provide important curriculum and training guidance.

Mills are the most frequently mentioned tool skill requirement, followed by lathes. Software experience with Mastercam is most desirable, specifically for CNC Programmers, but CAD is also important within the broader automated machinist category.



6. General Respondent Feedback

The study reflects views of employers across various segments, including staffing firms, material manufacturers for the clean energy sectors, and machine shop providers. Workforce development organizations should view staffing firms as potential strategic partners, particularly for their ability to create a direct channel for talent placement. Pleasanton-based

Bayside Solutions has multiple clients throughout the Bay Area who are hiring CNC employees; some of these clients regularly serve clean energy companies.

“We do work with machine shops and some of them do support solar manufacturers. As of right now we have 10 to 15 positions open with three companies. I believe at least two CNC clients support solar manufacturers. We’d be happy to collaborate, on the condition that the candidates meet our clients’ requirements.”

- Marshal Smith, Account Executive – Bayside Solutions

Materials manufacturers for the solar sector require that upwards of 20% of their staff have automated machinist-related skills.

“We grow silicon, fabricate quartz, and sell finished parts to semiconductor and solar industries. ... We employ 90 in California and have 20 CNC operators and programmers on staff. Our turnover rate is 10% and we look for people with two years’ experience or a certificate from DeAnza College.”

- James Herger, HR Manager - West Coast Quartz

A number of companies in the study said they want to break into the solar and clean energy sectors but are finding it difficult because of price pressures from lower-cost international providers.

“We can't compete on pricing. We quoted ten projects to ten solar companies and didn't get any. We would love to get in but it’s hard to get through the door. We do both precision parts and volume, but if a client wants volume it will go with an overseas manufacturer. Semiconductor pays the best, biotech comes in second.”

- Sales Manager – Bay Area Machine Shop

7. Summary

The labor market for *experienced* CNC machinists is rising because of high attrition rates among skilled workers within the manufacturing and machine tooling service sectors. In parallel, growth of the clean energy industry as well as demand from solar R&D and early-stage companies in the Bay Area will continue to drive demand for local, quick-turnaround, high-precision tooling and machining services. SWIC and similar programs should support CNC training.

7.1. Next Steps

SWIC hosted its third forum, “Energy Management Professionals: Optimizing Efficiency and Renewables,” on June 17 at Foothill College. Additional 2011 forums and themes currently scheduled include:

- Forum 4 - July 22 – Integrating Internship, Networking and Placement
- Forum 5 – Sept. 23 – Solar Thermal, Storage and Integrated PV
- Forum 6 – Nov. 18 – Smart Grid and Green IT

In addition, SWIC continues to conduct primary research and publish studies, including its monthly Job Boards Study, which provides an analysis of high-demand employment opportunities in the solar and energy efficiency sectors, and quarterly surveys from partner California State University, San Jose.

7.2. Industry Call to Action

SolarTech and its partners need more contact and strong industry engagement with leaders in the emerging renewable energy sector to ensure that SWIC continues to provide up-to-date job trend analysis. By identifying the right job growth opportunities at the right time, SWIC can better advise training providers and talent coaches how best to respond to industry needs.

Supporting SolarTech and SWIC helps grow business and the industry faster and smarter. Support SWIC and become involved in SWIC forums, symposiums and surveys. Contact David McFeely, SWIC Program Director, at dmcfely@solartech.org or at 408-529-0508.



Appendix 1: Methodology

The study is comprised of two phases.

Phase I

The Job Boards Study included a quantitative analysis of all listed jobs in the Bay Area for “machinists” and “technicians”. The sources of data were Craigslist and job board aggregator www.simplyhired.com. This work entailed extracting the job postings into a database, creating summary statistics, and creating graphs. Phase I also included a qualitative analysis of the requirements, highlighting trends for all machinist positions.

Phase II

Developed interview questions and conducted one-on-one interviews with a number of industry personnel in solar manufacturing, service companies and staffing agencies. The objective was to conduct five interviews.

Deliverables:

Phase I

Summary statistics and graphs of jobs in CNC for solar and service industries highlighting the following (slide presentation):

- Job Titles
- Leading Employers
- Education requirements
- Experience requirements

Phase II

Summary of interviews highlighting key takeaways for each segment (solar manufacturers; service providers; staffing agencies). Presentation of strategic recommendations for SWIC regarding CNC training and placement.

Schedule:

The duration of the project was two weeks, starting May 9th and ending May 20th

- Phase I was delivered: 5/16
- Phase II was delivered: 5/20