A California Success Story

Sheet Metal Apprenticeship's Contribution to Energy Efficiency

HVAC INDUSTRIAL ARCHITECTURAL METAL EXPERTISE
ENERGY SOLUTIONS

JOINT COMMITTEE ON ENERGY AND ENVIRONMENTAL POLICY

Intelligent Green Building Solutions for Indoor Environment Quality!

The Mission of the Joint Committee on Energy and Environmental Policy is to promote responsible environmental policy in the State of California and encourage efficient HVAC market transformation through collaboration with industry stakeholders and regulatory agencies.

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EXECUTIVE SUMMARY

A trained, highly-skilled workforce is the key to conducting the business of energy efficiency in California.

California stands as an example that energy efficiency has proven to be a cost-effective solution to problems ranging from dependency on oil to global warming and green house gas emissions. Apprenticeships tie workforce development and training to employers directly involved with delivering the efficient technologies necessary to accomplish our collective goal of reducing energy consumption. Programs that expand upon apprentice career-based training and education help stimulate economic and community development. Accredited apprenticeship training programs establish partnerships among business, education and government to build the skills of our workforce for current and future energy efficiency needs.

With a history of apprentice training programs aimed at energy efficient methodologies, CAL SMACNA contractors and the California Sheet Metal Workers' (SMWIA) local unions have an accomplished workforce educated in green building design codes and energy efficiency skills. With 15 training facilities throughout the state and thousands of workers being trained daily in HVAC specialties, such as testing, adjusting and balancing, commissioning, sound and vibration, and indoor air quality, the union sheet metal industry assists in implementing building energy efficiency and green house gas reduction programs.

Energy efficiency programs can reduce California's energy demands. A fully-trained and certified SMWIA HVAC technician knows how to install, operate, maintain, and repair these complex systems with skills to keep systems operating at peak efficiency, saving energy and money.

THE NEED FOR ENERGY EFFICIENCY

History

Arguably, the major source of economic instability during the 1970s was energy. The United States faced shortages of electricity, gasoline, and heating oil, leading to the shutdown of factories and schools, the cancellation of some commercial airline flights, electrical brownouts, and massive lines at service stations. Blackouts plagued cities and industries, most spectacularly in New York City during July of 1977. High fuel prices drastically reduced the productivity of American industry. Heavy fuel imports harmed the U.S. balance of payments and destabilized the international monetary system.[1] The 1970s are also remembered for the many emergency energy conservation measures undertaken for the first time. Thermostats were lowered to sixty-eight degrees, air travel and highway speed limits were reduced, coal-to-oil conversions were halted, while the U.S. licensed more nuclear power plants, relaxed environmental regulations, and approved daylight savings time in winter. Carpools and public transportation increased in popularity as gas stations closed or limited sales. As well, business and school schedules were shortened to conserve fuel.[2]

Our dependence on foreign oil has continued to grow and plague the US economy. Many mechanical and electrical systems continue to operate inefficiently. These inefficiencies have only exacerbated our energy crisis and expelled millions of tons of greenhouse gasses into the atmosphere. In addition, our workforce is aging, putting us on a collision course with disaster. In response to this, the energy efficiency (EE) market is growing rapidly. The California Energy Commission is investing in new technologies, tools, and methods to further boost the cost effectiveness of energy efficient products by supporting an integrated portfolio of research projects that address energy efficiency and demand/response needs in the commercial, residential, industrial, agricultural, and water supply sectors. Forty-four percent ($21.6 million) of public interest energy research PIER research funding in 2007 was allocated to energy efficiency and demand/response technology development. Of this $21.6 million, over sixty percent ($13.3 million) was used for energy efficiency technology research, with the remainder for end-user demand/response technologies.[3] It is in our best interest to invest in programs that expand upon apprentice career-based training and education. Both economic and community development is enhanced by accredited apprenticeships that establish partnerships among business, education and government to build the skills of our citizens to assure an adequate workforce for current and future EE needs. Apprenticeships tie workforce development and training to employers directly involved with delivering the efficient technologies necessary to accomplish our collective goal of reducing energy consumption.

Energy efficiency and demand/response programs are key strategies for addressing climate change and meeting the AB 32 goals for greenhouse gas emissions. These programs can continue to reduce

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[1] Matthew J. Bruccoli and Richard Layman. Gale Cengage, "1970's Business and the Economy: Energy in the 1970s." American Decades.. Gale Cengage, 1995. eNotes.com. 2006. 23 Feb, 2009 <http://www.enotes.com/1970-business-economy-american-decades/
energy>

[2] Matthew J. Bruccoli and Richard Layman. Gale Cengage, "1970's Lifestyles and Social Trends: The Energy Crisis." American Decades. 1995. eNotes.com. 2006. 23 Feb, 2009 <http://www.enotes.com/1970-lifestyles-social-trends-american-decades/energy-crisis>

[3] California Energy Commission Public Interest Energy Research (PIER) Program 2007 Annual Report Commission Report, April 2008. CEC-500-2008-026-CMF. Arnold Schwarzenegger, Governor.

California's energy demands, make businesses more competitive, and allow consumers to save money and live comfortably.[4] Even temperate climates in California are becoming increasingly dependent on air conditioning. The area around San Francisco, from Santa Rosa to San Jose, for example, now has a central air conditioning saturation of nearly 50 percent – double previous estimates. More than 75 percent of new single-family homes in the area are projected to have central air conditioning.[5] Air handling systems manage comfort levels of indoor air, and protect against contaminants and health threats. A fully-trained and certified Sheet Metal Workers' International Association (SMWIA) heating, ventilation, and air conditioning (HVAC) technician who has successfully completed an apprenticeship knows how to install, operate, maintain, and repair these complex systems. The SMWIA apprentice/journeyperson is a valuable asset to architects, building owners and managers; with skills to keep commercial HVAC systems operating at peak efficiency, saving energy and money.[6]

The Bigger Picture of Apprenticeship

By the end of the second quarter of Fiscal Year 2006, there were over 422,000 active apprentices participating in the Registered Apprenticeship system. During this period, the number of newly registered apprentices (federal workload only) increased to over 40,000, of which 20,859 were registered in the first quarter. In addition, over 77,000 newly registered apprentices were entered into the Registered Apprenticeship Information System (RAIS) as a result of the partnership between Federal and State staff. Of the 422,234 total apprentices, the majority (74 percent) were in the Construction trades. Nationally there are over 29,000 program sponsors representing approximately 250,000 employers who had invested an estimated $2 billion in training more than 468,000 apprentices.

The Employment and Training Administration (ETA) provides oversight, guidance and policy development, and support through a federal investment of $21.1 million in FY 2008. The ETA established the High Growth Job Training Initiative; a strategic effort to prepare workers to take advantage of new and increasing job opportunities in high growth, high demand and economically vital sectors of the American economy. In addition to numerous industry-specific solutions, the ETA identified a core set of priorities and is targeting worker training and career development resources towards helping workers gain the skills they need to build successful and meaningful careers in these and other growing industries. Since 2003, the U.S. Secretary of Labor has announced 22 investments totaling more than $37 million to address the workforce needs of the energy industry. The ETA has sought to understand and implement industry-identified strategies to confront critical workforce challenges. Through multiple forums, the ETA has listened to employers, industry associations, labor-management organizations, and others in the energy industry regarding their efforts to identify challenges and implement effective workforce strategies. The ETA has worked with the energy industry to identify its particular hiring, training, and retention challenges.[7] Apprenticeship in the HVAC industry is a combination of on-the-job training and related classroom instruction in which workers learn the practical and theoretical aspects of a highly skilled occupation. The U.S. Department of Labor lists the following advantages of apprenticeship:

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[4] Jackalyne Pfannenstiel, John L. Geesman presided over 2007 Integrated Energy Policy Report Committee; 2007 Integrated Energy Policy Report —IEPR Committee Final

[5] 2007 Integrated Energy Policy Report —IEPR Committee Final

[6] Article online. Available from <http://www.sheetmetal-iti.org/careers/com_hvac.shtml>

[7] USDOL/ETA Presentation to Provide an Overview of Registered Apprenticeship, 2/10/09

Leverage of over $2 billion in private investment in education and training from program sponsors (Source: OA Estimate)
A return of $50 in federal and state tax revenue for every $1 invested (Source: NASTAD Study)
Has an employer return on investment ROI estimated between 300 and 1000% (Source: AART)
Once completed their apprenticeship, participants earn an average of $45,000 per year, and can earn up to $60,000 (Source: OA)
Has an 87% satisfaction rate by employers who highly recommend the model to their colleagues
Operates and achieves these outcomes for less than $75 per apprentice (compared to other federal programs that range from approximately $3000-$20,000 per participant).[8]

SHEET METAL/HVAC APPRENTICESHIP

Industry Created Solution

Back in 1981, the Sheet Metal Workers' International Association (SMWIA) and the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) determined there was a need for an apprentice training program to teach and train for methodologies to improve EE while maintaining indoor air quality (IAQ). Through research and development, the sheet metal industry was smart to stay away from quick-fix solutions for EE, instead bringing attention to the problem of sick building syndrome(SBS), often diagnosed when buildings were made energy efficient to the detriment of the indoor environment of the building. Sick building syndrome causes are frequently pinned down to problems with the HVAC systems. Symptoms are often dealt with after the fact by boosting the overall turn-over rate of fresh air exchange with the outside air, but the new green building design goal should be to avoid most of the SBS problem sources in the first place, minimize the ongoing use of volatile organic compound VOC cleaning compounds, and eliminate conditions that encourage allergenic, potentially deadly mold growth.[9]

Always in the forefront, SMACNA and the SMWIA contribute to the HVAC industry by training its workforce to be highly familiar with green building design codes and other EE skills. The sheet metal industry has identified the need to conduct energy audits not only in new buildings, but also when retrofitting older buildings. An audit determines where energy is being wasted or used inefficiently. Energy retrofit projects are then monitored throughout the construction phase, at project completion, and in many cases the post-retrofit energy savings are also monitored to ensure energy cost savings are being realized. Long before "green" became mainstream, the SMWIA and SMACNA joint apprenticeship programs trained green, having made a commitment to teach building energy auditors and technicians about energy efficiency. Indeed, sheet metal apprenticeship is on an upward climb, with the industry citing the following reasons to join the workforce:

Exciting training opportunities
Ability to earn while learning

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[8] USDOL/ETA Presentation to Provide an Overview of Registered Apprenticeship, 2/10/09.
[9] Mold and Mildew PDF file. National Institute of Environmental Health Science Retrieved on 2009-02-19. Article online. Available from <www.niehs.nih.gov/health/topics/agents/mold/docs/mold.pdf.>

Varied, interesting work
Travel
Excellent health benefits
Continuing education
Job security
Safe working conditions
A voice in union democracy
Substantial pension upon retirement
Career advancement opportunities

Not only is the sheet metal workforce being taught on state of the art equipment and current curricula, they are instructed in SMACNA industry standards and the mechanical codes affecting the systems they install. SMACNA standards and technical manuals address all facets of the HVAC and sheet metal industry, from duct construction to the installation of air pollution control systems, including:

energy efficiency
custom metal roofing, including energy efficient cool roofs
seismic restaurant guidelines of mechanical systems
duct sealing and cleanliness for new construction, and
proper smoke/fire damper installation

A Thriving Joint Labor/Management Program

Over 650 union sheet metal and air conditioning contractors are represented by CAL SMACNA, a non-profit trade association that employs more than 25,000 men and women throughout the State of California. There are eight SMACNA offices in the State and five SMWIA offices. Together, they fund and oversee 15 local joint apprentice and training committee JATC training facilities. These facilities are dedicated to providing the career training necessary to meet the needs of today's HVAC market. They have the capability to train up to 4,000 individuals at any given time. Current industry funding for the California programs exceeds $64 million annually, with funding provided through provisions contained within their collective bargaining agreements.

California's Regional Blueprint Planning Program 281 provides a model example of the potential benefits of regional planning. The program involves the proactive engagement of all segments of the population, as well as critical stakeholders in the community, business, academia, developers, construction, and environmental organizations, to foster consensus on a vision and preferred land use pattern in a given region. The California Energy Commission's PIER group has developed a Distribution Research Program intended to support technologies that provide efficient, reliable and affordable energy to customers through a low-carbon energy network, and to bring those technologies to market.[10] As stakeholders in the greening of California, additional programs are available to enhance job opportunities for contractor members in the sheet metal industry. For instance, the Bay Area SMACNA provides numerous training programs for their

[10] 2007 Integrated Energy Policy Report —IEPR Committee Final

member contractors at no cost to the member firm. Member firms receive reimbursement for additional programs such as Business Management and Technical degrees; Graduate II Programs; SMU Service Managers Training; Shop Standards Certification Program; Hazardous Materials and Safety Program; Web-site Development.[11] The sheet metal industry has been setting the standard for quality for over 100 years. By attending regular educational seminars and assisting with the drafting of SMACNA standards and local codes, contractors stay on the cutting edge of industry trends and regulations. Furthermore, SMACNA contractors are dedicated to training and utilizing only the most qualified individuals.[12]

As the EE market expands to meet our societal and environmental needs, there is no doubt these programs will need to expand. Apprentice programs in the State of California last up to five years in duration and require a minimum of 1,000 contact hours with an instructor coupled with over 7,500 hours of on the job training. Apprentices accepted into the program are taught advanced mathematics along with the art and science of design, fabrication, installation, testing/balancing, commissioning and maintenance of building HVAC systems. The SMWIA/SMACNA, through the National Energy Management Institute NEMI, has been certifying specialists in building commissioning and testing, adjusting, and balancing (TAB) for over 20 years.

The Apprenticeship Program for San Diego is accredited through Palomar College for 55 units towards a college degree. This training center is an off-campus facility of Palomar College and is operated by the industry. Qualified instructors are credentialed by the State of California. The instructors participate in continuing education by attending training sessions, sponsored by the International Training Institute (ITI).

As the Los Angeles/Orange County SMACNA program points out, opportunities are wide open in an industry growing as fast as the construction industry and particularly in a trade that is becoming more and more important every day. The industry's apprenticeship program provides excellent career opportunities, and at the same time, provides skilled craftspeople for a growing industry.[13] An individual who completes apprentice training in HVAC/EE has capabilities exceeding the average craftsperson. While other, short-term training programs are available, those tend to provide more specific training based on attendance or completion of a course. Training in an apprentice program is far more comprehensive and covers the many important aspects of building a career.

A CALIFORNIA SUCCESS STORY

The tasks before us are grand. Achieving maximum energy efficiency in buildings is essential to accomplish the goals set forth in the Public Utility Commission's Long Term Plan, in conjunction with the reduction of green house emissions as mandated in the 2006 Greenhouse Gas Reduction Act. CAL SMACNA and the California SMWIA Locals are committed to joining hands with other education stakeholders to provide "Green career paths". The JATC training centers across California are high-tech

[11] Bay Area SMACNA, Services. Article online. Available from <http://www.bayareasmacna.org/services.html>
[12] Orange Empire SMACNA, Contractors, Article online. Available from < http://www.smacna-oc.org/sheetmetalcontractors.html>
[13] SMWIA Local 105, Careers: Article online. Available from <http://www.local105.org/html/careers.html>

learning establishments offering degrees in association with local colleges. Thousands of sheet metal craftspeople have been trained or are in the training process. For example, SMWIA Local #162 represents more than 2,600 Northern California craftspeople from 29 counties in the Central and Northern Sacramento Valley, from as far east as the Nevada border and as far north as the Oregon border.[14]

Green buildings are not just a fad…they are the future. These buildings increase energy efficiency while reducing environmental problems through better use of design specifications, construction, and maintenance. Many career opportunities are available in sustainable building system design, fabrication, balancing, commissioning, service and operations. Our state-of-the-art training facilities across California demonstrate our commitment to the future.

[14] SMWIA Local 162, History. Article online. Available from <http://www.smwia162.com/about_history.cfm>

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