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ABSTRACT

Many kinds of jobs can be found in the renewable energy and energy conservation industries. This pamphlet indicates that a large career potential exists within the solar and conservation professions and trades. These careers consist of individuals who design, build, or install solar heating or hot water systems, who implement energy conservation measures, or who advise such projects. These kinds of professions and trades are further classified as: (1) energy-conscious designers; (2) energy-conscious designer/builders; (3) solar and conservation installers; and (4) energy conservation consultants. For each of 22 distinct occupations the role of that occupation is briefly explained, along with the typically required training needed to work in the field and to work independently. A reading list of references dealing with careers in renewable energy and energy conservation is also provided. (TW)

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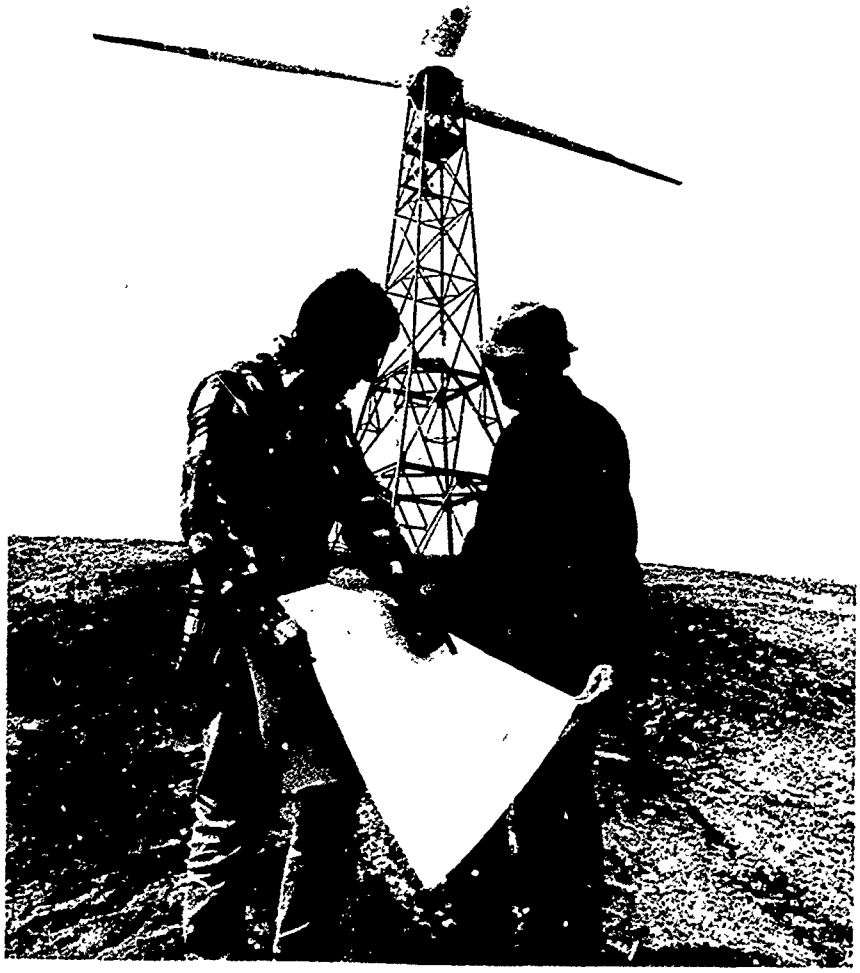
INFORMATION

U.S. DEPARTMENT OF ENERGY

CONSERVATION AND RENEWABLE ENERGY INQUIRY AND REFERRAL SERVICE

Careers In The Renewable Energy And Conservation Professions And Trades

Many kinds of jobs can be found in the renewable energy and energy conservation industries. Research and development, manufacturing, and distribution processes create employment for scientists, engineers, managers, technicians, many types of skilled and unskilled laborers, salespeople, marketing experts, information specialists and others. There is also a need for renewable energy and energy conservation specialists in fields such as finance, investment, real estate, insurance, and law.



However, it is within the solar and conservation professions and trades that the largest career potential exists. This group consists of individuals who design, build, or install solar heating or hot water systems, who implement energy conservation measures or who advise on such projects.

There are four main types of renewable and conservation professions and trades:

1. ENERGY-CONSCIOUS DESIGNERS use their knowledge of architecture, the building trade, solar components, engineering, energy conservation and renewable energy options to design solar and energy-conserving buildings and systems;
2. ENERGY-CONSCIOUS DESIGNER/BUILDERS use their knowledge of architecture, the building trade, and energy conservation measures to construct solar and energy conserving buildings and additions;
3. SOLAR AND CONSERVATION INSTALLERS combine the skills of roofing, plumbing, sheetmetal work, electrical work, insulating, masonry and carpentry to install active solar heating and hot

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water systems in buildings and increase building energy efficiency; and

4. ENERGY CONSERVATION CONSULTANTS advise on all aspects of active or passive solar systems, energy conservation measures, and renewable energy options, including design, financing, economic feasibility, and sizing. Energy auditors analyze energy consumption and sources of heat losses in homes and other buildings. Energy service companies look at energy consumption and needs in commercial and industrial buildings and suggest conservation plans, sometimes aiding with financing.

Those already working with the heating and cooling, design, or construction of buildings are the best prepared to become solar/conservation professionals and tradespeople. Heating and refrigeration contractors, builders, engineers, architects, etc., all have skills that can be adapted to energy conservation.

Work in the renewable energy field does not generally constitute a new career; it is usually a specialization within an existing career. A solar builder, for instance, is always a builder first and a solar expert second. Broader training is indispensable if the demand in the renewable energy area is not sufficient to support full-time employment.

Some form of education in renewable energy, whether it be academic or vocational, is needed for both novices and experienced professionals and tradespeople. Installation details for active solar systems, while similar to those for conventional heating or hot water units, are slightly different and demand greater attention. A study by the National Association of Plumbing, Heating and Cooling Contractors showed that even master plumbers need the experience of installing five or six systems before they feel they can do it correctly. If an active system is designed improperly, money is wasted on a system that will not work.

Architects, engineers, and other designers who draw plans for passive solar buildings need a comprehensive understanding of glazing, heat flow, heat storage, and sizing methods.

Insulation and superinsulation designers and builders should have both a formal knowledge of insulation principles and experience with current techniques.

Industrial and commercial building energy conservation, while representing a smaller total market than the residential sector, is an important part of cost control for businesses and institutions. Engineering training is generally required in this area.

Other renewable energy technologies such as wind power, geothermal energy, hydroelectric power, ocean energy and bioconversion, as well as larger-scale solar technologies such as solar thermal power generation employ smaller numbers of individuals, but the employment potential in these fields may be significant in a given geographic area. Individuals interested in selling or servicing wind or photovoltaic equipment need mechanical or electrical training and experience.

The biomass and alcohol fuels industries employ farmers or foresters, chemical process workers, and a sales and distribution network to market products and services.

Specializing in small-scale, rural, or appropriate-technology applications may offer opportunities for overseas employment or for service within the U.S.

Colleges, universities, technical schools, community groups, solar manufacturers, utilities, and trade unions may offer solar courses or training programs. Trade unions and state energy offices may supply this kind of information. The training required for conservation professions and trades varies from state to state. Local building code officials, trade unions, state employment offices, and schools offering solar/conservation programs can answer state-specific questions. The accompanying chart shows the major solar professions and trades, how they apply to solar, renewable energy and conservation, and typical educational or licensing requirements.

Reading List

The following references contain additional information on careers in renewable energy and energy conservation:

Articles

EDUCATION: LAUNCHING A CAREER IN SOLAR...T. Brennan; Solar Age 7(8):22-27, August 1982.

EMPLOYMENT: BRIGHT HOPES AND BARE REALITIES...B. D'Alessandro; Solar Age 8(7):19-20, July 1983.

FINDING A SOLAR EDUCATION, AND THOSE WHO HAVE ONE...Solar Engineering & Contracting 2(6):31-33, September/October 1983.

MORE JOBS IN RENEWABLE ENERGY BUT PROGRESS BELOW EXPECTATIONS... R. Pollock; Renewable Energy News 7(1):2, April 1984.

THE OTHER ENERGY CAREERS...K. Bellechild; Career World pp 21-23, October 1984.

SOLAR JOBS STILL REQUIRE TRAINING...Solar Engineering & Contracting 3(6):30-31, November/December 1984.

SOLAR TECHNICIANS AND MECHANICS: A KEY TO STAYING IN BUSINESS...W.G. Ward; Solar Engineering 6(10):36, 75, October 1981.

Books

OPPORTUNITIES IN ENERGY CAREERS...National Textbook Co., 4255 W. Touhy Ave., Lincolnwood, IL 60646, 1983, 160 pp.

THE SOLAR JOBS BOOK...K. Erickson; Brick House Publishing Co., Andover, MA 01810, 1980, 211 pp.

Report

SOLAR ENERGY EMPLOYMENT AND REQUIREMENTS, 1978-1983...G.W. Levy and J. Field, Battelle Columbus Laboratories, Columbus, OH, 1980, 200 pp. Report No. DOE/TIC-11154. Available from National Technical Information Service, 5826 Port Royal Rd., Springfield, VA 22161.

Typical Required Training

Occupation	Role	To Work	To Work Independently
Renewable Energy System Design			
Architect	Building design & passive system design	Bachelor of architecture, masters of architecture, or informal	+3 yrs. exp. & state license exam +2 yrs. exp. & state license exam 12 yrs. exp. & state license exam
Mechanical Engineer	Thermal design, specs. for construction details of active & passive systems (inciuding HVAC), performance analysis, wind & hydroelectric system design	Engineering degree or informal	+4 yrs. exp. & state E.I.T. & P.E. exam
Building Designer	Design of private buildings below a specified price	Informal	12 yrs. exp. & state E.I.T. & P.E. exam
Structural Engineer	Building design, apparatus (facilities) design	Engineering degree or informal	+4 yrs. exp. & state E.I.T. & P.E. exam 12 yrs. exp. & state E.I.T. & P.E. exam
Environmental Designer	Landscaping, passive building & site design	Informal	
Electrical Engineer	Electrical system & controls design, research & development, wind & photovoltaic system design, utility interfacing	Engineering degree or informal	+4 yrs. exp. & state E.I.T. & P.E. exam 12 yrs. exp. & state E.I.T. & P.E. exam
Chemical Engineer	System design, fluid characteristics & flow calculations, heat transfer calculations, corrosion studies, performance analysis	Same	Same
Interior Designer	Passive building design	Informal	
Energy Manager	Monitoring industrial/ commercial energy use, suggesting conservation & financing strategies	Energy Management Degree or informal	
System Installation & Maintenance			
Installer	Installation & maintenance of systems: solar, wind, photovoltaic, hydroelectric	Contracting experience or formal training typical	HVAC contractor or master plumber legally responsible for active system installation, or license in a few states
Builder	Overseeing construction of active & passive building projects	Informal	
HVAC Contractor	Installation & maintenance of active systems	Informal	License or master plumber legally responsible
Plumbing Contractor	Installation & maintenance of active systems	Informal	Master plumber's license - local

Typical Required Training - Continued

Occupation	Role	To Work	To Work Independently
System Installation & Maintenance - Continued			
Carpentry Contractor	System installation & construction	Informal	
Masonry Contractor	Passive building	Bricklayers - informal Others - apprenticeship typical	
Glazier	Installation of glazing for passive systems	Apprenticeship typical	
Mechanical Contractor	Installation & maintenance of active systems	Informal	Master plumber legally responsible
Roofing Contractor	Installation & maintenance of active air systems	Apprenticeship typical	
Electrical Contractor	Installation & maintenance of electrical wiring and controls of systems	Apprenticeship typical	Local license
Sheet Metal Contractor	Installation & maintenance of active air systems	Apprenticeship typical	
Energy Auditor	Analyzing buildings for energy waste	Informal	
Consultant	Advises on all aspects of all systems.	Varies	

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