

2-18-09
Workforce
Development
in Alaska

<target><bill></bill><subject>2-18-09 Workforce Development in
Alaska</subject><comm>SWTR26</comm></target>

STATE OF ALASKA

Department of Education & Early Development

Office of the Commissioner

SARAH PALIN, GOVERNOR

*Goldbelt Place
801 West Tenth Street, Suite 200
P.O. Box 110500
Juneau, Alaska 99811-0500
(907) 465-2800
(907) 465-4156 Fax*

Presentation by Commissioner Larry LeDoux

Senate Special Committee on World Trade, Technology & Innovation
Senator Lesil McGuire, Chair

Wednesday, February 18, 2009, Alaska Capitol Butrovich Room 205

Senate Bill 31

Alternative & Renewable Energy Production Tax Credit

Preparing Alaskans for jobs and careers in emerging alternative energy
technologies

Career & Technical Education (CTE) in Alaska's secondary schools

Technological advances and global competition have transformed the nature of work. Tomorrow's jobs will require more knowledge, better skills, and more flexible workers than ever before. Current CTE programs incorporate rigorous academic, technical and employability skills so tomorrow's workers can continually update their knowledge and skills and be prepared to change jobs and careers several times. Career clusters identify educational pathways from secondary school to postsecondary education in apprenticeship, technical schools, two- and four-year colleges, graduate school, and the workplace.

What CTE programs were available to secondary students in 2007-2008?

Federal Perkins' grantees reported 16,620 non-duplicated CTE "participants" in grades 9-12 (i.e. enrolled in a CTE course that addressed industry and academic standards) and 933 CTE "concentrators" (earned 2 or more credits in the same pathway *and* graduated that reporting year). Included in these numbers are 2,825 students who took a Tech Prep CTE course and earned postsecondary credits or advance points toward a future apprenticeship program. Enrollment in the career clusters most closely associated with alternative energy technologies were:

# non-dup. participants	# graduated concentrators	Career Clusters (and example programs)
2578	157	Construction (includes drafting & building projects)
1068	112	Transportation, Distribution & Logistics (auto repair, small engines)
1049	47	Manufacturing (i.e. welding boats & trailers, woodworking)
739	27	Scientific & Technical Services (STEM, Project Lead the Way)
665	42	Agriculture & Natural Resources (fisheries, horticulture)
653	34	Information Technology (networking, A+ & Cisco)

Alternative Energy Program Notes

Alternative energy issues, strategies, techniques, and practices represent a significant opportunity for upgrading CTE programs through industry partnerships, collaborative curriculum revision, teacher training and internships. Current practice, however, is not systematic and usually depends on the initiative of the individual teacher. Some anecdotal examples:

- Sitka Education Consortium – energy efficient remodeling and weatherization (federal YouthBuild and HUD funding)
- Bristol Bay High School – rebuilding a VW bus to be energy-efficient
<http://www.alaskabug.blogspot.com/>
- Mat-Su home construction program emphasized energy efficient windows and mold prevention
- Nome JROTC incorporated Young Engineers' program
- Cordova Energy Center: The mission of the Cordova Energy Center is: To use the resources of our community, our natural surroundings, and sound scientific research to develop an interactive website that offers useful information regarding energy efficiency, and allows for on line collaboration and documentation of alternative energy projects.
cordovaenergycenter.org

Potential exists for programs with significant interest in alternative energy:

- Project Lead the Way is a national STEM (science, technology, engineering & math) program with prescribed curriculum and teacher training leading to postsecondary education. Dimond (Anchorage), Lathrop (Fairbanks), Mat-Su Career & Technical (Wasilla) and Juneau Douglas (Juneau) high schools are developing the pre-engineering programs. At this time the approved curriculum is not focused on alternative energy or "green" issues, but teachers may incorporate their own project ideas as the applied component (e.g. Mat-Su students designed a glass sorter for use in recycling.)

- Nome and Bering Strait would like to develop a program to support operation of the local wind generators, but to date haven't been successful in winning funds or technical assistance.
- The Construction Academies represent an opportunity to make a large number of beginning construction students aware of "green" issues and practices in the construction industry.
- There are postsecondary programs with the potential for secondary/postsecondary program articulation and technical assistance at AVTEC and UAF's Alaska Center for Energy and Power.

How is CTE delivered to secondary students in AK?

- Most secondary CTE is delivered through the efforts of 172 comprehensive high schools and their staff. Creative delivery strategies are quite common, however, to expand the offerings available to students by taking advantage of instruction from non-school sources. These include local experts, distance delivery, on-site short term intensive courses taught by itinerants, buying "seats" in college or adult courses (e.g. ETT course offered by the local fire department).
- Specialized CTE schools or programs have been established. They include:
 - Magnet CTE high schools (students enroll full-time)
 - Hutchison Technical High School – Fairbanks
 - Mat-Su Career & Technical High School – Wasilla
 - Career-focused programs (students stay enrolled in home high school)
 - King Career Center – Anchorage
 - Mat-Su District-wide Programs – Mat-Su School District
 - NACTEC – Bering Strait and Nome School Districts
 - Construction Academies – Anchorage, Fairbanks, Mat-Su, Kenai, Juneau, Ketchikan
 - Boarding Schools have a CTE component for interested students
 - Galena Interior Learning Academy (GILA) – Galena
 - Nenana Living Center – Nenana
 - Mt. Edgecumbe - Sitka
 - Funding-dependent programs (Topic depends on winning competitive funding)
 - Sitka Career Consortium – Sitka
 - Yuut Elitnaurviat – Bethel
 - SERRC – Juneau

CTE and WFD (WorkForce Development) Advisory and Advocacy Groups currently in AK – Feb. 2009

Title	Sponsorship	Why it exists	Representation	Our take
<p>AWIB - Alaska Workforce Investment Board --Standing Committees</p> <ul style="list-style-type: none"> • Executive • Policy & Planning / Assessment & Evaluation • Workforce Readiness and Employment & Placement • Legislative • Youth Council <p>http://labor.state.ak.us/awib/</p>	<p>AK Department of Labor</p>	<p>AWIB “provides policy oversight of state and federally funded job training and vocational education programs. AWIB is the policy oversight board for vocational and technical education in Alaska under the federal Workforce Investment Act.”</p>	<p>Commissioner of Education (or designee) is statutory member – and is assigned to AWIB’s Policy, et.al. Committee. Most members are from private industry. Appointed by Governor. Supports a number of new regional WIBs to work at more local level – ANC, Mat-Su, etc. Helen is EED’s designee to Youth Council</p>	<p>Not truly a state-wide, inter-departmental WFD oversight board since moved out of Gov’s Ofc. Has influence – not authority - on policy for Univ or EED. Mostly an advisory board for DOL’s WIA (Workforce Investment Act) programs that emphasize short-term training for adults and out-of-school youth (especially dropouts). AWIB wants schools to teach/assess SCANS skills (see resolution).</p> <p>G:\Perkins\Collaborations\AWIB</p>
<p>APICC - Alaska Process Industry Careers Consortium http://www.apicc.org/</p>	<p>Industry supports, plus seek grants for projects & initiatives (usually DOLWD)</p>	<p>“APICC has been, and continues to be, at the forefront in connecting the workforce development needs of processes industries with Alaskan secondary education and post-secondary educational institutions. We plan on not only being full participants, but leading the way in industry driven data, needs, standards and curriculum to meet present and future workforce challenges.”</p>	<p>industry, education, labor, and trade leader building partnerships for workforce development in the oil, gas, mining, power, and other process industries in Alaska</p>	<p>10 year history of developing and supporting programs for process industry technicians that are truly seamless across UA campuses. Support K-12 efforts with: TIE - Teacher Industry Externships and YES – Youth Employability Skills standards</p>

CTE and WFD (WorkForce Development) Advisory and Advocacy Groups currently in AK – Feb. 2009

Title	Sponsorship	Why it exists	Representation	Our take
<p>PARW - Putting Alaska's Resources to Work http://www.parw.info/download/PARW_PLAN_FINAL_2.pdf</p>	<p>APICC related industries plus mining interests</p>	<p>Industry-led, evolving and broad based alliance of oil, gas and mining industries and workforce development organizations working together to ensure Alaska will have a highly skilled and globally competitive workforce that meets the current and future needs of Alaska's process industries. They are attempting to implement their plan (see website)</p>	<p>Alaska Chamber of Commerce ACSA VTEP Alaska Mineral & Energy Education Fund (AMEREF) Alaska Miners Association (AMA) Alaska Oil & Gas Association AKPTA APICC Alaska Trucking Association, Inc. Anchorage Economic Development Corporation AASB Alaska Association for Career and Technical Education Association of General Contractors of Alaska (AGC) Resource Development Council for Alaska, Inc. The Alaska Support Industry Alliance University of Alaska EED</p>	<p>PARW has held state conferences to create awareness of its issues, and is now trying to build momentum through committee work. Many of this group's on-going activities are being held jointly with APICC. It may be evolving into a part of the APICC (a lot of overlap in membership and staff support)</p>
<p>ABEC Alaska Business Education Compact</p>	<p>Started in old School to Work program days; now kept going by industry and educator interest</p>	<p>To prepare our youth, we need a coherent system that connects employers, educators, parents, community members and students. This system must be locally driven by parents and the private sector. Members of the Alaska Business Education Compact unite to build and sustain this system to successfully prepare our youth for their futures.</p>	<p>"We are employers, educators and community members who work together to ensure all Alaska's youth are prepared for work and lifelong learning." Active members include Dave Rees (chair), Sarah Scanlan-First Alaskans Inst, Mary Shields (business), UA personnel and some district CTE coordinators; Helen regularly attends the</p>	<p>This group is primarily networking, although they have attempted to develop program ideas and find someone else to implement (i.e. apply for grants). In the past couple years, these have included replicating an OR model for students to earn "employability credentials" through series of job shadowing experiences, and conducting long-term (5 yr) follow-up of AK</p>

CTE and WFD (WorkForce Development) Advisory and Advocacy Groups currently in AK – Feb. 2009

Title	Sponsorship	Why it exists	Representation	Our take
			meetings. Mtg notes go to large email list.	students to see how they fare in ed. and employment.
VTEP - Vocational Technical Education Providers www.vtep-alaska.org/	Self-interested networking at this point, although originally established by DOL/AWIB to create a progress report "Building a Statewide System"	VTEP members work cooperatively to advance a more integrated and effective vocational education and career training system in the State of Alaska; as of May, 2008 are part of the AWIB's Workforce Readiness/Employment & Placement Committee.	VTEP as a membership organization is guided by a memorandum of understanding signed by affiliated members who commonly seek a quality CTE program in Alaska that is: needs-driven, accessible to all Alaskans, interconnected, accountable, collaborative, and sustainable.	This group waxes and wanes in activity, although they meet via teleconference fairly regularly to communicate. They were instrumental in developing the original proposal for the state tech-prep consortium that works with districts and postsecondary statewide (and bridges the 3 University MAU's)
AACTE - Alaska Association for Career & Technical Education www.actealaska.org	Professional organization affiliated with national ACTE (Association for Career and Technical Education)	AACTE is the professional organization for Alaskan career & technical education (CTE) teachers and anyone interested in promoting and strengthening CTE programs in our state.	Primarily secondary CTE teachers, some postsecondary personnel	Collaborate with EED to support professional development related to CTE pathways.
AKCIS - Alaska Career Information System Advisory Board www.akcis.org	Alaska Commission on Postsecondary Education & DOL	Advise AKCIS about recommended improvements to its services	Invited AKCIS users, plus DOL and EED staff	The sponsorship of ACPE has provided new energy to this useful product.
Alaska Construction Academy Advisory Board http://www.alaskaca.org/servlet/content/advisory_board.html	Alaska Construction Foundation (and Alaska General Constructors)	Advisory Board meets a couple times a year to provide advice or feedback on features, organization, etc. of AKCIS website	EED Commissioner is a Board member, plus Esther Cox Alaska General Contractors Alaska Works and union representatives, legislators	Construction academies began as DOL Youth First project, picked up and advocated with legis. by the AGC Kathleen Castle, Esther's daughter-in-law is the Executive Director
CTSO - Career and Technical Student	EED/CTE and involved school districts and (usually	This is a historical part of CTE programs, used to	BPA- Business Professionals of America	Exists in AK because of commitment of local

CTE and WFD (WorkForce Development) Advisory and Advocacy Groups currently in AK – Feb. 2009

Title	Sponsorship	Why it exists	Representation	Our take
Organizations http://www.ctsoalaska.org	volunteer personnel)	teach employability skills such as teamwork, social skills, leadership and also assess technical skills through competitive events. All supported organizations are connected to a national organization.	DECA- An Association of Marketing Students; FCCLA- Family, Career, and Community Leaders of America FFA- Agricultural Education HOSA- Health Occupations Students of America Skills USA	teachers who serve as state advisors. EED supports state-level coordination and events with a small grant
Alaska Tech Prep Consortium Advisory Board www.alaska.edu/techprep/index.html	UAA	Provide policy advice and oversight to Alaska Tech Prep programs that connect high school and college instruction and/or apprenticeship programs to prepare students for technical careers in fields with strong employment growth and earnings potential.	"The active governing board consisting of skilled and experienced secondary and postsecondary educators, business and industry representatives."	This board is connected to Perkins' grant, but attempts to involve broader players in tech-prep-like activities from other campuses. Fred Villa has been actively involved as he attempts to coordinate CTE programs across campuses.

RESOLUTION NUMBER 08-02
RESOLUTION IN SUPPORT OF POLICY TO ENSURE
EMPLOYABILITY SKILL STANDARDS AND ASSESSMENTS

WHEREAS, the Alaska Workforce Investment Board is a private industry driven public organization that is accountable through its members and staff, including representatives from business and industry, education, and organized labor to the residents, the Legislature and the Governor of Alaska;

WHEREAS, the Alaska Workforce Investment Board acts as the lead state planning and coordinating entity for state human resource programs involving employment training, vocational education, and workforce development;

WHEREAS, the partnership between the Department of Labor and Workforce Development and the Department of Education and Early Development, under regulations adopted by the State Board of Education and Early Development are a first step to ensure that students in Alaska have basic transitional skills for post-secondary training and education and entry to the workplace;

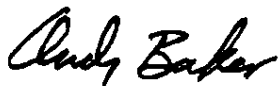
WHEREAS, existing regulations do not incorporate adequate employability skill standards and assessments;

NOW THEREFORE BE IT RESOLVED that the Alaska Workforce Investment Board officially supports regulations to ensure *employability skill standards and assessments* into Alaska's secondary schools, youth training programs and post-secondary training institutions to ensure Alaska's youth have work-readiness skills.

















CERTIFICATION

The Alaska Workforce Investment Board held a meeting duly and regularly called, noticed, and convened this 21st day of May, 2008 and the foregoing Resolution was adopted unanimously at said meeting.

Signed this 21st day of May 2008.



Andy Baker, Chair
Alaska Workforce Investment Board

Career Cluster Name	Description	Career Cluster Name	Description
 Agriculture, Food & Natural Resources	The production, processing, marketing, distribution, financing, and development of agricultural commodities and resources including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.	 Hospitality & Tourism	Hospitality & Tourism encompasses the management, marketing and operations of restaurants and other foodservices, lodging, attractions, recreation events and travel related services.
 Architecture & Construction	Careers in designing, planning, managing, building and maintaining the built environment.	 Human Services	Preparing individuals for employment in career pathways that relate to families and human needs.
 Arts, Audio/Video Technology & Communications	Designing, producing, exhibiting, performing, writing, and publishing multimedia content including visual and performing arts and design, journalism, and entertainment services.	 Information Technology	Building Linkages in IT Occupations Framework: For Entry Level, Technical, and Professional Careers Related to the Design, Development, Support and Management of Hardware, Software, Multimedia, and Systems Integration Services.
 Business, Management & Administration	Business, Management and Administration careers encompass planning, organizing, directing and evaluating business functions essential to efficient and productive business operations. Business Management and Administration career opportunities are available in every sector of the economy.	 Law, Public Safety & Security	Planning, managing, and providing legal, public safety, protective services and homeland security, including professional and technical support services.
 Education & Training	Planning, managing and providing education and training services, and related learning support services.	 Manufacturing	Planning, managing, and performing the processing of materials into intermediate or final products and related professional and technical support activities such as production planning and control, maintenance and manufacturing/process engineering
 Finance	Planning, services for financial and investment planning, banking, insurance, and business financial management.	 Marketing, Sales & Service	Planning, managing, and performing marketing activities to reach organizational objectives.
 Government & Public Administration	Executing governmental functions to include Governance; National Security; Foreign Service; Planning; Revenue and Taxation; Regulation; and Management and Administration at the local, state, and federal levels.	 Science, Technology, Engineering & Mathematics	Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.
 Health Science	Planning, managing, and providing therapeutic services, diagnostic services, health informatics, support services, and biotechnology research and development.	 Transportation, Distribution & Logistics	Planning, management, and movement of people, materials, and goods by road, pipeline, air, rail and water and related professional and technical support services such as transportation infrastructure planning and management, logistics services, mobile equipment and facility maintenance.

CORDOVA ENERGY CENTER



[Home](#)

[About Us](#)

[Forum](#)

[Projects](#)

[Contact](#)

WELCOME

To the Cordova Energy Center

If you want some basic information check out the projects and about us pages. If want to get in on the action or see what the latest news is cruise on over to the forums!



Jim Jarvis and Bruce Cain

Upcoming Events

October

- 8** Class meets with Jim Jarvis.
- 10** Wind turbine is installed.
- 21** Anemometer installed above reseviior.

November

- 8** Ben and Grafton give speech to Alaska School Board

Recent Forum Topics:

- [Home Energy Audit](#)

Statistics : Posted by [Adam Low](#) • on Mon Oct 27, 2008 4:58 am • Replies 8 • Views 101

- [Boat Heating?](#)

Statistics : Posted by [Darin](#) • on Fri Nov 07, 2008 11:14 pm • Replies 1 • Views 33

- [Update on Wind Data](#)

Statistics : Posted by [Drew](#) • on Wed Nov 12, 2008 5:30 am •
Replies 2 • Views 28

- [Solar Panels](#)

Statistics : Posted by [Adam Low](#) • on Mon Oct 27, 2008 5:25
am • Replies 8 • Views 82

- [Rain Gutter Power](#)

Statistics : Posted by [Reuben](#) • on Fri Nov 07, 2008 11:10 pm •
Replies 3 • Views 39

- [Tidal Power](#)

Statistics : Posted by [Trae](#) • on Tue Oct 28, 2008 10:52 pm •
Replies 5 • Views 71

- [What other ways can we reduce energy costs?](#)

Statistics : Posted by [Ben Jamm](#) • on Tue Nov 04, 2008 10:18
pm • Replies 3 • Views 63

- [Saltwater burning?](#)

Statistics : Posted by [Darin](#) • on Fri Nov 07, 2008 11:17 pm •
Replies 0 • Views 39

Copyright © 2008 Drew Lindow. All Rights Reserved.

[Home](#)[About Us](#)[Forum](#)[Projects](#)[Contact](#)

About Us

The Cordova Energy Center is founded by the physics class of Cordova High School. Our teacher, Mr. Adam Low, decided that this year he wanted to dramatically change his teaching method and the students agreed to his new, radical concept. We put our textbooks aside and went on to begin solving real world problems in our local community. The reasoning behind this is that one can learn a subject much more effectively if they are doing hands on work with real life meaning. This website was designed and is run by two of the students in order to create a place where the class and others with interest in our endeavors can communicate.

Mission Statement

The mission of the Cordova Energy Center is: To use the resources of our community, our natural surroundings, and sound scientific research to develop an interactive website that offers useful information regarding energy efficiency, and allows for on line collaboration and documentation of alternative energy projects.

CORDOVA ENERGY CENTER



[Home](#)

[About Us](#)

[Forum](#)

[Projects](#)

[Contact](#)

Projects

Welcome to the projects page. Here we have a list of all the energy related projects being run by students. We've got many great ideas so check them out. If you'd like to get involved or just send a comment check the Contact page and throw us an email.

Wind Power

One group of students are developing a wind feasibility study and will soon be installing a wind generator at the highschool.

[learn more](#)

Conservation

Another group is looking into energy conservation techniques and will be doing energy audits later in the year.

[learn more](#)

Copyright © 2008 Drew Lindow. All Rights Reserved.

Alaska Energy Careers

A SITKA ENERGY PROJECT WEBSITE



[Home](#) | [About](#) | [FAQs](#) | [Construction](#) | [Mining](#) | [Oil & Gas](#) | [Transportation](#) | [Alternative Energy](#) | [Site Map](#)

About this Project

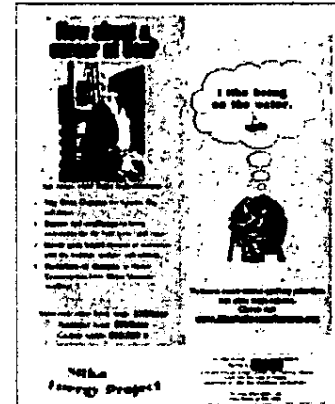
About the Alaska Energy Careers site

In Spring 2006, Sitka Works was awarded a High Growth Job Training Initiative grant through the Alaska Department of Labor and Workforce Development, to fund the *Sitka Energy Project*. The main goal of this six-month project is to raise awareness, and educate Sitka's high school students, their teachers, and parents about the exciting jobs available in energy-related industries such as construction, mining, oil and gas, and transportation.

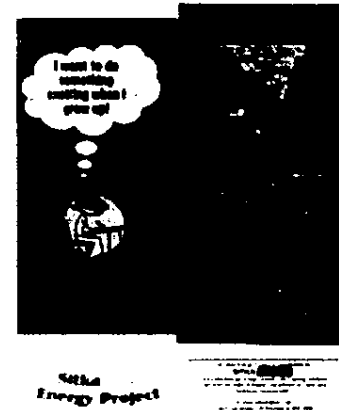
There are several components to our project, with objectives that include:

- **Developing a network of representatives of high growth industries and statewide training entities** who are willing and able to participate in educating Sitka's students, teachers and parents. Students at all three high schools will be impacted – Sitka High School, Mt. Edgecumbe High School and Pacific High School.
- **Increasing awareness of energy careers** - through posters at the high schools, the *Sitka Energy Project* website, presentations by industry and training representatives at the high schools, presentations by project staff at public meetings, interviews on radio and television, and personal contacts. The website is designed as a steppingstone for Sitka youth – launching them from the familiar to the unknown. It features young people who graduated from one of our local schools and then went on to enter a career in an energy industry.
- **Educating high school youth about energy careers** - through the Energy Career Camp for MEHS students (August 20-26), classroom visits by industry and training representatives, an Energy Night, a tour of Juneau energy facilities for Pacific High School students, a new AutoCAD class at Sitka High School in spring 2007, and work experiences, job shadowing, or mentorships with local experts.
- **Educating high school teachers and counselors** – through classroom visits by industry and training representatives, a 3-day tour of energy facilities in Anchorage for four Sitka High teachers, and AutoCAD training for two SHS teachers.
- **Developing new energy-related curriculum** for high schools students as a result of the AutoCAD training and the Anchorage tour.

Related Links



[Download Ian's poster \(PDF\)](#)



[Download Meredith's poster \(PDF\)](#)



Energy Career Camp participants touring the new Sitka Auditorium

Who's Responsible?

By Sheila Finkenbinder, Director
Sitka Works!

We've heard a lot about energy in the news lately. Here in Sitka, it only takes a bird to stop the electricity from traveling from the hydroelectric plant into our computers, lights, cash registers, stoves - all the things we count on to get our jobs done and keep our lives running smoothly. Further away, it only takes a little sand, salt, or bacteria to corrode the massive pipelines that carry oil from Prudhoe Bay to the rest of the country. If the oil stops, the ramifications to the nation's economy are huge.

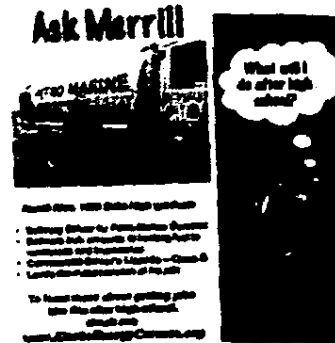
How quickly the supply of energy can be threatened or shut off, and we are all inconvenienced by the lack of power to run our lives. Most of us sit by and wait for someone else to fix the problem. Depending on the severity of the situation, we may just relax instead of working on a report, we may holler and blame, or we may actively look for ways to save the lives that are threatened by the situation. But, most of us don't do anything to fix the situation.

However, there are a bunch of folks who spend their days making sure that energy supplies are available and affordable for all of us to use. These individuals could be considered some of today's heroes. These are the men and women who don't mind doing dirty, and sometimes dangerous things, on a daily basis, so that we can all live comfortably and worry-free. In fact, most of them really enjoy their jobs.

The Sitka Energy Project, at Sitka Works, has a mission of raising the awareness among Sitka's high school students, as well as their parents and teachers, of the many jobs in energy-related industries that can be exciting, critically important, and often financially rewarding.

The young lady in the photo is a Corrosion Engineer with Alyeska Pipeline Service Company. Her name is Tawna Beer, and she is a 1998 Sitka High School graduate. With a Bachelor of Science degree and several certifications through the National Association of Corrosion Engineers (NACE), Tawna has a challenging and rewarding career that is critical to the nation's power supply and economy. Most of her training has been in the field and on the job. An entry-level position like hers could pay at least \$50,000 annually, with "lots of opportunity to grow at a fast pace", as Tawna stated.

Many very good jobs in energy-related industries do not require college degrees. These could include jobs in construction, mining, oil and gas, transportation, and yes, hydroelectric and other alternative sources of energy. As a matter of fact, many of the folks who work at things like building, installing, repairing, exploring, processing, or transporting, got those jobs through short-term training and



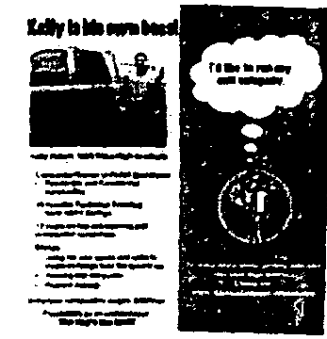
Sitka Energy Project

Download Merrill's poster (PDF)



Sitka Energy Project

Download Tawna's poster (PDF)

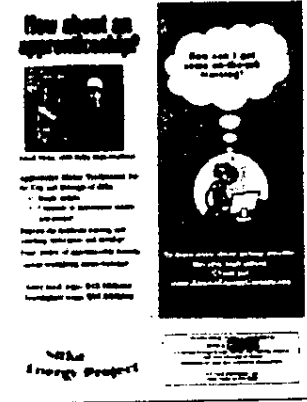


Sitka Energy Project

Download Kelly's poster (PDF)

on-the-job experience. The salaries that people working in the trades earn often rival, or often surpass, those earned by many college graduates. Please understand, there's nothing wrong with getting a college education. In fact, it can often move you further up the ladder, faster, depending on your career area. However, a college degree also comes with a heavy price tag, in the form of student loans that can take years to pay back. Alternatively, many types of technical, hands-on training in the trades can pay off for a young person in a hurry.

Over the next few months, we will be encouraging Sitka's high school students to explore some of the rich variety of jobs that are available in energy industries, many of which can be achieved even if the student isn't ready, willing or able to attend college right away. We hope that the parents of those students will be listening too.



[Download David's poster \(PDF\)](#)

Sitka Energy Project

On-going support for Alaska Energy Careers is provided by  - committed to Alaska's next generation of workers.

© 2006 Sitka Energy Project. A project of Sitka Works!
This project was funded by a grant awarded under the President's High Growth Job Training Initiative, as implemented by the U.S. Department of Labor's Employment and Training Administration and the State of Alaska, Department of Labor and Workforce Development.

Site designed and built by Red Bear Network Services. Site maintained by Shelter Cove Publishing

Revised: July 25, 2008 3:19 PM

Please refresh your page if you've been to this website before this date!

Course Name: Architectural Design

District Name: Kodiak Island Borough School District

Adapted from:

Developed by: Barry Altenhof

Date: December, 2004

EED USE ONLY

Date:

Approval Status:

National Skill Standards Board	NSSB	www.nssb.org	CAD Standards
American Design Drafting Association	ADDA	www.adda.org	CAD/Drafting Standards

Student Performance Standards (Learner Outcomes)	Specific Occupational Skills Standards	Grade level Expectations in Reading, writing, math	Alaska Content Standards	Alaska Employability Standards	Alaska Cultural Standards	All Aspects of Industry	Assessments
Become aware of career opportunities in Architecture		R4.2 W4.1	E—A,B	A,B	D-6	Business Planning	Written Project
Understand architectural history & value of architecture		R4.2,4.3,4.4 4.9 W4.2	T-ALL	A,B	E-4	Business Planning, Tech.Prod, Personal	Written/cad project
Develop an awareness of important 20 th century American architects.		R4.2,4.3,4.4 4.9 W4.2	H-ALL				Written/cad project
Assess and use basic elements of design	CADD3.1-3.2	R4.2	T-ALL			Tech.Prod	CAD proj.
Develop a working knowledge of building codes		R4.2		A6		Tech.Prod	CAD proj./ Test
Understand basic concepts and components of solar and wind power generation.	CADD,M1-M8	M5.4.1	M-B,D,E	A,B		Tech.Prod	CAD proj./ Test
Understand key components of energy efficient design		R4.2	S-A			Tech.Prod	CAD proj./ Test
Apply relevant schedules and specifications to projects				A,B		Tech.Prod	CAD proj./ Test
Perform calculations relevant to residential design	CADD,M1-M8	M5.4.1	M-B,D,E	A,B		Tech.Prod	CAD proj./ Test
Learn structural characteristics of concrete, steel, wood		M5.4.1 R4.2	M-ALL			Tech.Prod	CAD proj./ Test
Use autocad software to create residential plans based on specific design criteria.	CADD3.1.2 CADD1.1-1.4 CADD2.1-2.3		T-ALL	A,B		Tech.Prod Bus.Plann. Mgmt.	CAD proj. Design Competition

Course Name: Architectural Design	District Name: Kodiak Island Borough School District
Adapted from:	Developed by: Barry Altenhof
Date: December, 2004	

EED USE ONLY	Date:
Approval Status:	

Student Performance Standards (Learner Outcomes)	Specific Occupational Skills Standards	Grade level Expectations in Reading, writing, math	Alaska Content Standards	Alaska Employability Standards	Alaska Cultural Standards	All Aspects of Industry	Assessments
Create and present a senior design project that incorporates solar and/or wind power into the design.	CADD,C1-C10 C-26 M1-M8 S1,2,8,10	R4.2,4.3,4.4 4.9 W4.2 M2.4.1,3.4.1 5.4.1	T-ALL M-B,D,E	A,B	A,C,E	Business Planning, Tech.Prod Mgmt. Prin.Tech. Finance, Labor	*Project Presentation *Design comp. *Eval.by CT Advisory Bd.

Major Instructional Resources: (websites, textbooks, essential equipment, reference materials, supplies)

Textbook:

Jefferis & Madsen, Architectural Drafting and Design, Delmar, 2004

Reference:

Architectural Graphic Standards, Ramsey & Sleeper, Student Edition, AIA, 1994

Lester Walker, American Homes, Overlook Press, 1996

Crowley & Calloway, The Elements of Style, Simon & Schuster, 1996

Websites:

http://www.otherpower.com/otherpower_solar.html

<http://www.alternative-energy-news.info/technology/solar-power/>

www.Autodesk.com Autodesk, Inc.

www.nccer.org National Center for Construction Education Research

www.adda.org American Design Drafting Association

www.nssb.org National Skill Standards Board

Course Name: Architectural Design	District Name: Kodiak Island Borough School District
Adapted from:	Developed by: Barry Altenhof
Date: December, 2004	

EED USE ONLY	Date:
Approval Status:	

www.tenlinks.com

Various links to CAD/technical/design websites.

Software:

Autodesk Architectural Desktop, 2009

Kodiak High School CAD lab Equipment:

**24 Dell Workstations , Windows XP network
HP 5000 Laserjet Printer
HP 800 Inkjet plotter
HP 8275 Computer projector & instructional screen.**

Other resources:

Kodiak High School Career Center, Kathy Watkins, Career Pathways Coordinator, 481-2525

Kodiak High School Career Technology Advisory Group-Providing Co-op assistance, scholarships, and material support to Kodiak High School Career Technology programs.



U.S. Department of Energy
Energy Efficiency and Renewable Energy

[EERE Home](#)

K-12 Energy Lesson Plans & Activities

[Biomass Energy](#)

[Energy Basics](#)

[Energy Efficiency & Conservation](#)

[Environment](#)

[Geothermal Energy](#)

[Hydrogen & Fuel Cells](#)

[Hydropower](#)

[Ocean Energy](#)

[Solar Energy](#)

[Transportation Fuels](#)

[Wind Energy](#)

[For Grades K-4](#)

[For Grades 5-8](#)

[For Grades 9-12](#)

[Search by Subject & Grade](#)

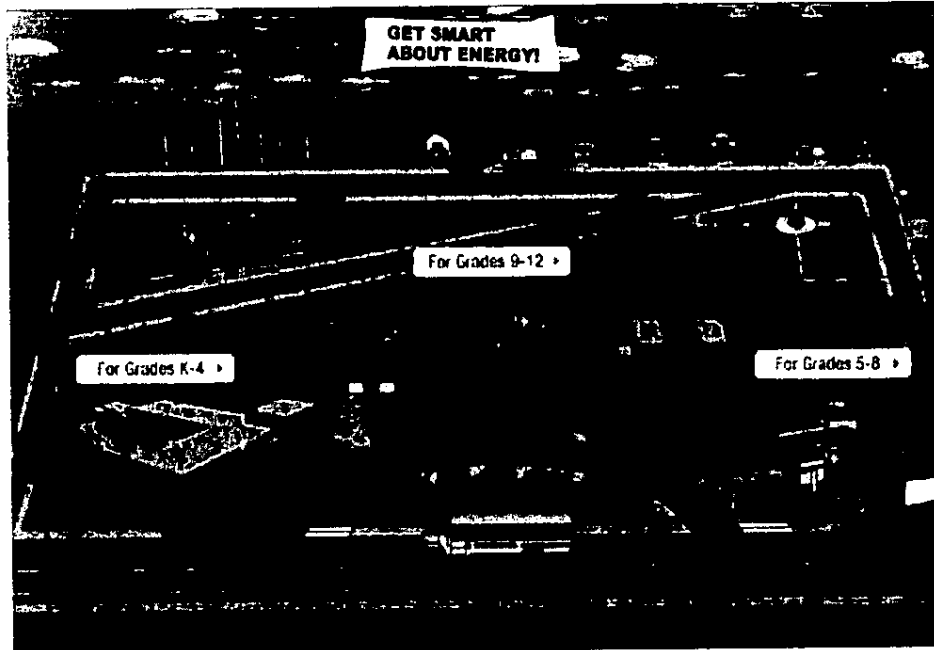
[Contacts](#)

[Search Help](#) | [More Search Options](#) |

[Printable Version](#)

[EERE Information Center](#)

On this site you'll find links to more than 350 lesson plans and activities on energy efficiency and renewable energy for grades K-12. Each includes a short summary that identifies curriculum integration, time, materials, and national standards. For more education resources, please see the [EERE Energy Education Web site](#).



[Printable Version](#)

[Education Home](#) | [EERE Home](#) | [U.S. Department of Energy](#)
[Webmaster](#) | [Web Site Policies](#) | [Security & Privacy](#) | [USA.gov](#)
Content Last Updated: October 12, 2007



K-12 Energy Lesson Plans & Activities

K-12 Lesson Plans &
 Activities Home

Search Help | More Search Options |

Biomass Energy

[Printable Version](#)

[EERE Information Center](#)

Energy Basics

**Energy Efficiency &
 Conservation**

Environment

Geothermal Energy

Hydrogen & Fuel Cells

Hydropower

Ocean Energy

Solar Energy

Transportation Fuels

Wind Energy

For Grades K-4

For Grades 5-8

For Grades 9-12

Search by Subject & Grade

Contacts

Grades 9-12

Here you'll find lesson plans on energy efficiency and renewable energy for grades 9-12.

Biomass Energy

- [Biofuel Production \(8 Activities\)](#)
- [The Biofuel Project: Creating Bio-diesel](#)
- [A Pre-Treatment Model for Ethanol Production Using a Colorimetric Analysis of Starch Solutions \(1 Activity\)](#)
- [Reaction Rates and Catalysts in Ethanol Production \(1 Activity\)](#)
- [Investigating and Using Biomass Gases](#)
- [Photosynthesis and Biomass Growth \(7 Activities\)](#)
- [Renewable Energy Plants in Your Gas Tank: From Photosynthesis to Ethanol \(4 Activities\)](#)
- [Statistical Analysis of Corn Plants and Ethanol Production](#)

Energy Basics

- [Energy Posters - Energy Basics](#)
- [Secondary Energy Infobook and Secondary Infobook Activities \(19 Activities\)](#)
- [Thermodynamics Teacher and Student Guides \(6 Activities\)](#)
- [Computer-Based Energy Projects \(4 Activities\)](#)
- [Energy Analysis](#)

Energy Efficiency and Conservation

- [Take the Energy Action Challenge](#)
- [Energy Efficiency Ambassadors \(9-12\)](#)
- [Energy Posters - Energy Efficiency and Conservation](#)
- [Energy Walkabout](#)
- [New Year's Resolution](#)
- [Passive Solar Building Design \(8 Activities\)](#)
- [Summer Camp 2050](#)
- [Watt Does It Cost To Use It?](#)

Environment

- [Energy Awareness Quiz](#)
- [Energy Posters - Environment](#)
- [How Big Is Your Footprint?](#)
- [Global Warming and Climate Change \(8 Activities\)](#)

Hydrogen and Fuel Cells

- [Hydrogen Sprint \(6 Activities\)](#)

Solar Energy

- [Understanding Solar Energy: Advanced Photovoltaic Investigations \(5 Activities\)](#)
- [Solar Cooking \(5 Activities\)](#)
- [Modeling the Process of Mining Silicon Through a Single Displacement/Redox Reaction](#)
- [Mini Rockets](#)
- [Photovoltaics: Solar Electricity \(4 Activities\)](#)
- [Photovoltaics Teacher and Student Guides \(10 Activities\)](#)
- [Renewable Energy and Photovoltaics \(5 Activities\)](#)
- [Survival Still](#)
- [What Does the Sun Give Us? \(5 Activities\)](#)

Transportation Fuels

- [Transportation Fuels: The Future is Today \(6 Activities\)](#)
- [Transportation Fuels Rock Performances](#)

Wind Energy

- [Building the Basic PVC Wind Turbine](#)
- [Wind Power \(7 Activities\)](#)
- [Scale Models and Wind Turbines](#)
- [See the Wind](#)
- [Wind Turbine Blade Design](#)

[Printable Version](#)



U.S. Department of Energy
Energy Efficiency and Renewable Energy

EERE Home

Energy Education

[Energy Education Home](#)

[Lesson Plans & Activities](#)

[Science Projects](#)

[Student Contests](#)

[Student Resources for Reports on Energy](#)

[Higher Education](#)

[Training & Careers](#)

[Energy Education Programs](#)

[School Buildings & Buses](#)

[Printable Version](#)

[Search Help](#) ■ [More Search Options](#) ■

[EERE Information Center](#)

Student Energy Competitions and Contests

Here you'll find resources for students of all ages on competitions and contests that promote awareness about energy technologies and issues, including energy efficiency and renewable energy.

American Solar Challenge

University teams, companies, and clubs from around the world build solar-powered cars and race them across the country. Sponsored by the U.S. Department of Energy.

EcoCar Challenge

EcoCAR is a U.S. Department of Energy three-year competition that will challenge university students to re-engineer a Saturn Vue donated by GM, using advanced vehicle technologies to reduce the vehicle's total environmental impact and lead the way to a sustainable transportation future.

Energy Challenge

Teams of college engineering students design energy efficiency and waste minimization concepts that have real applications in the pulp and paper industry.

ExploraVision

A competition administered by the National Science Teachers Association that encourages K-12 students to create technologies-including energy technologies- of the future.

EV Challenge

A competition that educates middle and high school students about innovative electric vehicle technology, as well as its benefits to society.

Foundation for Water and Energy Education: Energize Our Future College Scholarships

College scholarships for five high school students in the northwestern United States who write the best essays about the Northwest's energy future.

Hydro Power Contest

An opportunity for college students to demonstrate their ideas for turning water into power.

Hydrogen and Fuel Cell Competitions for Students and Teachers

Features contests for students in middle school,

high school, and college.

Igniting Creative Energy Challenge

An educational competition designed to encourage students in K-12 to learn more about energy and the environment.

National Junior Solar Sprint/Hydrogen Fuel Cell Car Competitions

A U.S. Department of Energy program where student teams in grades 6-8 construct model solar and hydrogen fuel cell cars and race them.

National Renewable Energy Laboratory: Student Programs and Competitions

A full range of activities for elementary and secondary school students that provide tutoring, mentoring, science demonstrations, awards and recognition, and more.

National Science Bowl

A U.S. Department of Energy academic competition where teams of high school students answer questions on scientific topics in astronomy, biology, chemistry, mathematics, physics, earth, computer and general science.

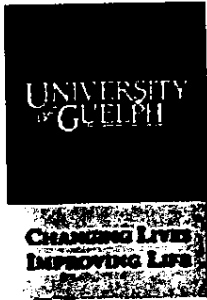
Solar Decathlon

A U.S. Department of Energy competition where teams of post-secondary students compete to construct the best energy-efficient, solar-powered houses.

 [Printable Version](#)

[Education Home](#) | [EERE Home](#) | [U.S. Department of Energy Webmaster](#) | [Web Site Policies](#) | [Security & Privacy](#) | [USA.gov](#)

Content Last Updated: 10/09/2008



U of G Hosts High School Wind Energy Competition

April 16, 2008 - News Release

It's only fitting that this year's wind energy competition at the University of Guelph will be held on April 22, national Earth Day.

WindENG is an annual event that brings together high school students from across Ontario to test out their energy-generating wind turbine designs and compete for cash prizes.

This year 200 students making up 32 teams will be visiting campus.

Judged by a panel of practicing engineers, the wind turbine designs are tested in the University's wind tunnel, and the top prize will go to the team whose windmill produces the highest average power output. Judges will also consider design functionality, creativity, environmental aspects and presentation.

The first place team will be awarded \$2,000, with \$1,000 going to the team that places second and \$500 to the third place team.

"WindENG helps high school students to connect engineering to design, challenge, fun and important societal needs," said engineering professor Warren Stiver, who is involved in organizing the event. "It also connects socially and environmentally meaningful engineering to the type of engineering that is happening at the University of Guelph."

In addition to the competition, high schools students will also attend information sessions on university life and co-op placements. They will hear about U of G's involvement in the BioCar project and participate in interactive workshops.

A variety of displays will be set up as part of the day-long event, featuring Engineers without Borders, the Engineering Society, the Women in Science and Engineering Student Group, and Creative Encounters. There will also be displays highlighting U of G research on solar energy, wind energy, biofilters, rain water harvesting, bioproducts, and water and sanitation in Cambodia.

Students will also have the opportunity to test engineering designs in the activity room and take part in campus tours.

For more information on **WindENG** (<http://www.windeng.com>).



2009 Southeast Bio-Energy Competition

The Nationally Environmentally Sound Production Agriculture Lab (NESPAL), in conjunction with the Southeast Bio-Energy Conference Committee has established a competition in four categories: Energy Conservation through Internet monitoring and control systems, Bio-Energy, Other Renewable Energies, and Home and Farm Energy Audits to Promote Energy Conservation. The Southeast Bio-Energy Conference/NESPAL award is intended to encourage the conservation of energy and the development and use of bio-energies.

Two separate competitions will be open to middle school and high school students: junior (grades 6-8) and senior (grades 9-12). Cash prizes of \$1,000 will be awarded for first place winners in each of the four categories. There will also be a grand prize for an additional \$1,000 for grand prize winner of all categories. The grand prize winner will be given the opportunity to meet with the Georgia Ag Innovation Center for the advancement of their idea and the grand prize winner's idea will be featured in the Future Farmstead. Second place winners will receive a plaque and a photo with Governor Sonny Perdue. In the instance that a team wins, the prize will be divided by the number of participants.

A short youtube video of 2-2.5 minutes should document the process, the reasoning behind the project, and the overall impact the project can have on the community. Each submission will be assessed by a predetermined panel of judges. Each project will be evaluated on resourcefulness, creativity, potential impact, and follow through.

Each team or individual interested is encouraged to write and submit a short synopsis of the project by March 15th. The completed project should be submitted by July 17th, 2009.

[Complete Details](#)

Resource Types: Contest/Award

Audience Served: Home Schools, Private Schools, Public Schools, Scouts/Youth Groups





Home
 How to Compete
 Awards
 Important Dates
 Registration
 Resources for Advisors
 Sponsors
 Volunteer
 Media Resources
 2008 Event

Imagine Tomorrow How to Compete

Topic and Challenges

Topic

How would you power your future?

As the world transitions to alternate energy sources, people have to make fundamental changes in the way they operate. In this high school energy competition, your team's task is to explore ways to enable some aspect of this transition. What types of inventions or redesigns will be needed to take full advantage of the new energy sources? How will suburbs, towns, and cities need to be redesigned? What types of behavior changes will be necessary, and how do we bring those about?

Challenges

Choose one of these challenges and then create a project that addresses it. Your team may choose to use one of the project examples provided on this Web site, or answer the challenge with your own original idea. The solutions are limited only by your imagination.

Challenge 1. Technology

Invent or re-design a machine or process that uses sustainable technologies for energy production, consumption, and conservation.

PROJECT EXAMPLES

- The front-loading washing machine uses much less water and energy than a conventional washing machine. Identify and re-design the next appliance or machine that will substantially lower energy use in your house.
- On long trips, most current hybrid cars primarily run on the gasoline engine. Determine what changes are required to make plug-in hybrids a viable mechanism for a 200-mile overnight trip.
- One of the challenges for hydrogen cars is the volume required for a storage tank. Identify the top technological innovations that would be required to run a larger vehicle, such as a train or 18-wheeler truck, on hydrogen. Demonstrate a prototype model using one of the key innovations.

Challenge 2. Design

Design a living/working space (a building, suburb, town, or city) that has significantly lower CO₂ emissions than at present.

PROJECT EXAMPLES

- In 2007 the U.S. Green Building Council developed a new set of standards for "green" school construction, and Washington State requires new school construction to meet The Leadership in Energy and Environmental Design (LEED) silver standards. Demonstrate the design of a highly energy efficient high school with a model and schematics.
- Washington State now uses over 1 million gallons of biodiesel a year, and use is growing rapidly. Design a town around a biofuel plant in central Washington that minimizes energy use for the town.
- As cities across the state look at developing new transportation systems, from public transportation to highways, they have to consider many issues. Design a low CO₂ transportation system for a city.

Challenge 3. Behavior

Consider the question of why people are resistant to adopting and implementing alternate sources of energy. Document a personal or social quality that contributes to this resistance, or demonstrate an intervention that can be applied at the personal, local, or societal level to encourage people to consider and adopt alternate

"The energy challenge is both the greatest threat and the greatest opportunity facing humankind in the half-century. Washington State University's *Imagine Tomorrow* high school competition encourages kids across the state to think about and tackle energy issues. What is particularly exciting is the level of out-of-the-box thinking."

—Denis Hayes, president of The Bullitt Foundation, board chair of the International Earth Day Network, and *Imagine Tomorrow* 2008 keynote speaker

energy sources.

PROJECT EXAMPLES

- As much natural gas is used to heat commercial buildings as is used to generate electricity in our state. Develop a set of incentive structures that could be used to get businesses to adopt alternative energy methods for heating or cooling in our state.
- The state tax on gasoline is 54.4 cents per gallon. Examine the effects that raising the state's gas tax would have on driving and transportation in Washington. Explore what share of the gas tax, if any, is spent on measures to conserve gas. If the tax were increased, how would you propose spending the added revenue to achieve the most beneficial result for reducing CO2 emissions?
- Oil refineries in Washington primarily get their crude oil from Alaska, meaning your car probably runs on oil from the North Slope. Examine the implications of drilling in the Arctic National Wildlife Refuge (ANWR) for the State of Washington.

Challenge 4. Multidisciplinary Collaboration

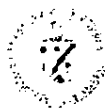
It is clear that viable approaches to a sustainable energy future require contributions from multiple disciplines and perspectives. Develop a project that incorporates expertise from at least two distinct disciplines to address some aspect of the shift toward alternate sources of energy. The disciplines must be distinctly and demonstrably different, and it must be clear that each is making a significant contribution to the overall project.

PROJECT EXAMPLES

- Converting freight trucks to biodiesel and the impact on food prices of doing so (brings together engineering and economics)
- Public reaction to solar panels and re-designing of the panels to make them more aesthetically pleasing (brings together psychology and architecture)
- Historical writing on eco-friendly actions and the impact on current public policy (brings together English and political science)

[Imagine Tomorrow](#), PO Box 641040, Washington State University, Pullman WA 99164-1040, 509-335-1467, [Contact Us](#)

Copyright © 2009 Board of Regents, [Washington State University](#) | [Accessibility](#) | [Policies](#) | [Copyright](#)



U.S. Department of Energy
Energy Efficiency and Renewable Energy

EERE Home

Energy Education

- Energy Education Home
- Lesson Plans & Activities**
- Science Projects**
- Student Contests**
- Student Resources for Reports on Energy**
- Higher Education**
- Training & Careers**
 - Continuing Education
 - Teacher Training
 - Careers & Jobs
- Energy Education Programs**
- School Buildings & Buses**

▼

Search Help | More Search Options |

EERE Information Center

[Printable Version](#)

Careers and Jobs in Energy Efficiency and Renewable Energy

Here you'll find resources about EERE's goals for the energy career market, information about energy-related careers, and job listings in renewable energy and energy efficiency.

- [Career Information](#)
- [Job Listings](#)

EERE and the Energy Job Market

"In just a few years, we can watch cars that run on plug-in batteries come off our assembly lines. We can see shuttered factories open their doors to manufacturers that sell wind turbines and solar panels that will power our homes and our businesses. We can watch as millions of new jobs with good pay and good benefits are created for American workers, and we can take pride as the technologies, and discoveries, and industries of the future flourish in the United States of America. We can lead the world, secure our nation, and leave our children a planet that is safer and cleaner and healthier than the one we inherited."

- President Barack Obama,
August 5, 2008

The United States is accelerating its quest to produce cleaner and more reliable energy and to use it more efficiently. This is creating a dramatic need for skilled workers to bring these changes about and solidify U.S. leadership in energy efficiency and renewable energy. Now, in times of extraordinary economic challenge, we have an opportunity to invest in U.S. workers and green technologies at the same time.

The Office of Energy Efficiency and Renewable Energy (EERE) is beginning to partner with federal and state programs as well as clean energy companies to help build a talented and knowledgeable workforce.

Career Information

Association of Energy Engineers

A source for information on the dynamic field of energy efficiency, utility deregulation, facility management, plant engineering, and environmental compliance.

Careers in Hydrogen and Fuel Cells

Lists resources that discuss the kinds of education and skills, both technical and non-technical, that will be in demand in this new and exciting field.

Careers in Renewable Energy

A U.S. Department of Energy fact sheet that gives an overview of the career opportunities in the renewable energy field.

DOE Career Opportunities

Features information about career opportunities at the U.S. Department of Energy and its laboratories.

Engineering: Go For It!

Opens up the world of engineering careers to high school students.

Environmental Career Center

Helps people work for the environment through comprehensive environmental and natural resources job listings, career news, inside tips and advice, employer interviews, and career research reports.

The Environmental Careers Organization

Features information on its career services and educational resources to help the next generation of environmental professionals.

Junior Engineering Technical Society

Provides programs and resources for high school students interested in engineering careers.

Occupational Outlook Handbook

A key word search using "energy" will locate information on career opportunities in energy.

The Solar Energy Institute

Offers a one-week summer program in Arizona that gives high school students the opportunity to learn about the solar energy field through lectures, tours, and hands-on research.

Welcome to the World of Engineering!

A guide from the American Society for Engineering Education for high school students interested in engineering and engineering technology careers.

Wisconsin K-12 Energy Education Program: Energy Careers

Features links to information on energy careers, energy education programs, and employers in the energy industry.

Job Listings

Alliance to Save Energy

Lists jobs available at the Alliance to Save Energy and other related organizations.

American Council for an Energy-Efficient Economy (ACEEE)

Lists energy-related employment opportunities at ACEEE and other organizations.

American Wind Energy Association: Wind Energy Career Center

Provides links to employers in the wind energy industry.

Centre for Alternative Technology

Posts vacancies of European companies in the renewable/sustainable development sector.

DOE Jobs Database

Features a searchable database of available jobs at the U.S. Department of Energy, as well as an automated job application system.

Energy Jobs Listings

A list of energy-related employers in the Northwest from the Energy Ideas Clearinghouse.

environmentjob.co.uk

Features listings of renewable energy and energy efficiency jobs and volunteer opportunities in the United Kingdom.

Fuel Cells 2000: Employment Resources

Lists fuel cell companies and helps match qualified job seekers with fuel cell companies.

Green Energy Jobs

A listing of jobs in the renewable energy industry.

Hydro Research Foundation: Job Postings

Posts job listings in the hydropower industry.

National Society of Professional Engineers: Energy Job Board

Features job listings, online resume posting, career tips, mentoring programs, continuing education opportunities, and resources for high school and college students.

National Energy Technology Laboratory Careers and Fellowships

Provides information on position vacancies and research opportunities at the Lab.

National Renewable Energy Laboratory: Employment

Features current job openings at the Lab.

PowerPlantPro

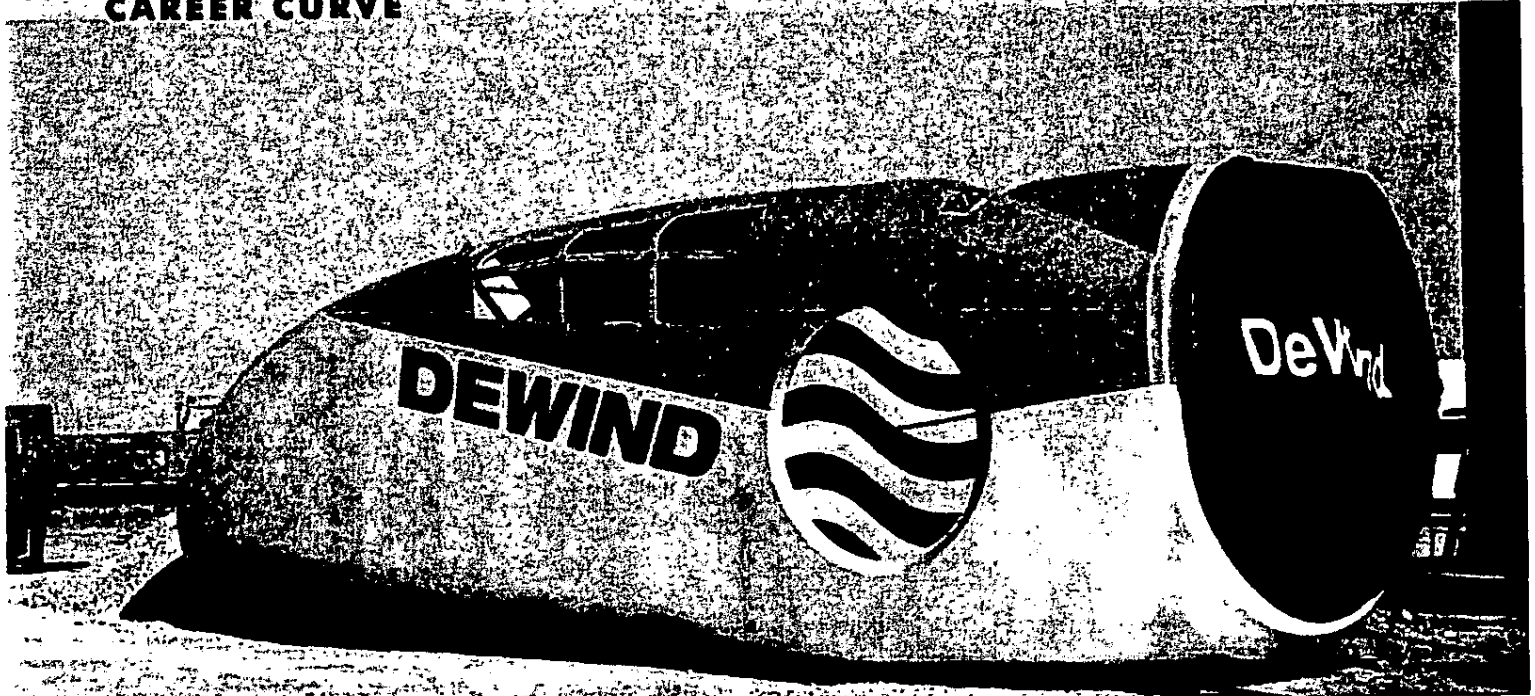
Posts jobs listings for power industry professionals.

 [Printable Version](#)

[Education Home](#) | [EERE Home](#) | [U.S. Department of Energy Webmaster](#) | [Web Site Policies](#) | [Security & Privacy](#) | [USA.gov](#)

Content Last Updated: 02/03/2009

CAREER CURVE



A section of the DeWind wind turbine.

PHOTO BY DON TIBBT

Wind Energy Technician

WIND ENERGY TECHNICIANS INSTALL, INSPECT, troubleshoot and repair wind turbines and turbine internal and external components such as programmable controllers, gear boxes, drive components, structural components, electronic equipment and electrical components. They review related manuals, blueprints and schematic diagrams to determine the tasks, tools, equipment and parts needed to maintain a highly automated system.

The Workplace

Wind energy technicians may work in turbine site construction, turbine manufacturing, in the distribution and generation industry, or for a utility company. Sites include wind farms and power plant facilities, and range from small communities to large metropolitan areas.

Educational Requirements

The job of wind energy technician requires the ability to understand and troubleshoot complex equipment, predict and prevent equipment failure, and work as a

team member with minimal supervision. Employers are looking for technicians who have the training to apply scientific and theoretical principles along with hands-on skills, and programs at community and technical colleges are growing sources of such training. Schools with programs that train for the wind energy industry include Texas State Technical College, Iowa Lakes Community College and Columbia Gorge Community College in Oregon.

Earnings

Wind energy technicians earn wages from \$18.00 to \$22.00 per hour, and a recent *Associated Press* story noted that turbine manufacturers and utilities are attempting to lure workers with wages of up to \$25.00 per hour. Opportunities also exist for job advancement within the industry.

Job Outlook

According to the American Wind Energy Association (AWEA), wind energy is one of the fastest growing sources of energy in the U.S. and abroad, with industry

growth averaging 22 percent from 2001 to 2006. AWEA also cites estimates from the Pacific Northwest Laboratory that U.S. wind energy potential is more than twice the electricity generated in the U.S. today. This growth and potential should create a greater demand for skilled professionals. ■

Explore More

To learn more about the wind energy industry and the growing opportunities for wind energy technicians, here are some sites to visit.

- American Wind Energy Association
www.awea.org
- Environmental Resources Trust, Inc.
www.ert.net
- National Renewable Energy Laboratory
www.nrel.gov
- Sustainable Energy Coalition
www.sustainableenergycoalition.org

CAREER CURVE

SCHOOL SPOTLIGHT

Texas State Technical College, West Texas

At the Sweetwater campus of Texas State Technical College (TSTC), West Texas, students may earn a certificate or an associate degree in the Wind Energy Technology (WET) program, which is designed to provide its graduates with the skills necessary to facilitate an easy transition into many levels of the wind energy industry. The curriculum was developed by the school's subject matter experts in collaboration with an advisory board of wind energy managers.

Doug King, one of the two instructors for the program, says that West Texas is in the center of development for the wind energy industry in the U.S. "We have some of the largest projects in the country," he notes. "The Sweetwater site is 1,000 megawatts, and the Florida Power and Light site is 700 megawatts."

TSTC students study in electronics and engineering labs equipped with new Windows XP networked computers and a variety of digital/analog electronics trainers/testers; electrical power equipment; National Instruments hardware and software instrumentation systems; Allen-Bradley programmable controllers; and an industrial machine vision system to provide the students with a real hands-on environment.

The program was developed to satisfy wind energy industry mandates, and in the first year, the courses include Introduction to Wind Energy, Wind Turbine Materials and Electro-Mechanical Equipment, Wind Power Delivery System, Digital Fundamentals, Industrial Automation, and both DC Circuits and AC Circuits. The students also take classes in topics such as professional development, computer applications, college algebra and composition.

In the second year, the courses include Programmable Logic Controllers, Basic Fluid Power, Wind Business, and Turbine Troubleshooting and Repair. The second year has a humanities/fine arts component

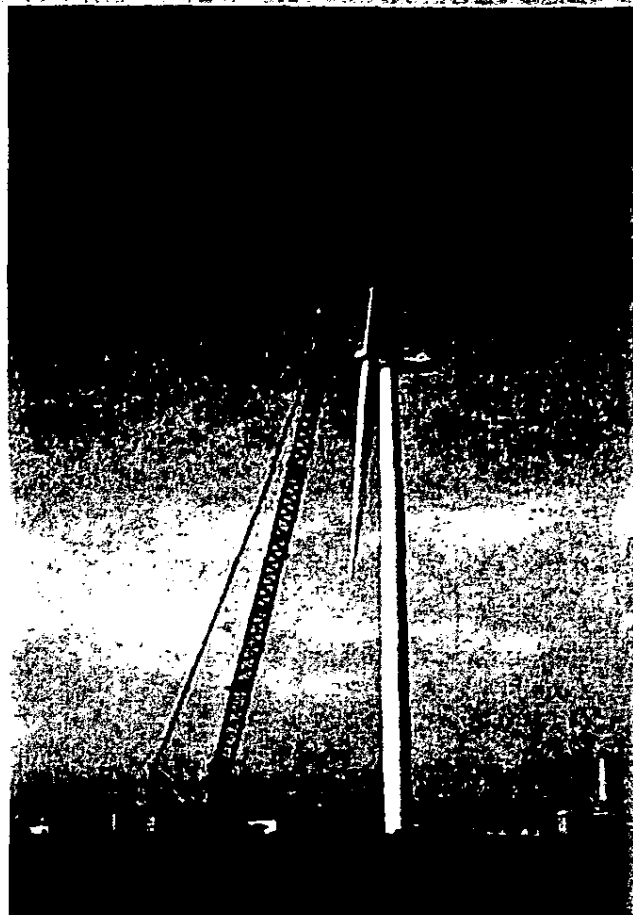
and electives in communications and behavioral/social science. There is also a co-op internship in the final semester, when students are required to participate in a paid internship with local companies.

King notes that the school has a brand-new, full-scale wind turbine that was purchased from DeWind, whose parent company is Composite Technology Corp. It is unique in that it uses synchronous power rather than power electronics to connect to the grid, and is the first 60-cycle machine in the United States. GE, Florida Power and Light, and Shermco Industries are among other companies that have contributed materials to the TSTC program.

TSTC notes that although the WET program builds the foundation for entry-level and advanced placement in the wind energy field, many of the classes in the program are offered as support courses and are designed to offer alternative placement options to graduating students who may decide to change career plans and enter a field other than wind energy.

According to King, they currently have 58 students in the program, but some drop out early when they find out that it is not what they want to do. "They spend three days in the field, shadow current technicians, climb turbines and see what the job actually is," he explains. "You have to be self-motivated to climb a 260-foot steel tower."

Students in the TSTC WET program are also provided with the opportunity to network with established industry professionals through the program's advisory committee. The advisory committee's purpose is to identify the knowledge and skills required for entry-level technicians, and it is a mandate of the Texas Higher Education Coordinating Board. The advisory commit-



tee for the TSTC WET program includes representatives from Texas Tech University, Florida Power and Light, WTX Wind Energy Consortium and GE Wind Energy.

King notes that students who come to the school are sometimes surprised by the fact that they are learning what he describes as "pretty heady stuff," but those who want to continue their education may go on to get an engineering or business degree. They might even attend Texas Tech University, which has a doctorate program in wind science.

For those who wish to go directly into this growing industry, King sees having graduated from the TSTC program as a huge plus. As he explains, "When they leave the program, they can go to a company and say, 'This is the education I have, and this is the experience I have. I can climb, I am willing to climb, and I can do the job.'"

For more information about the TSTC WET program, visit www.westtexas.tstc.edu. ■

ENERGY
EFFICIENCY
AND
RENEWABLE
ENERGY
CLEARINGHOUSE

Careers in Renewable Energy

The promise of a clean, never-ending (renewable) power and fuel supply in the United States depends on our ability to harness energy from sources such as the wind, sunlight, organic matter, the Earth's internal heat, and rivers. However, making this promise a reality requires workers dedicated to leading this country toward a sustainable energy future. If you are considering a career in renewable energy, this fact sheet can start you on your way. It will provide you with information on each of the major renewable energy technologies, the types of jobs you might find in each technology, and resources to help continue your research.

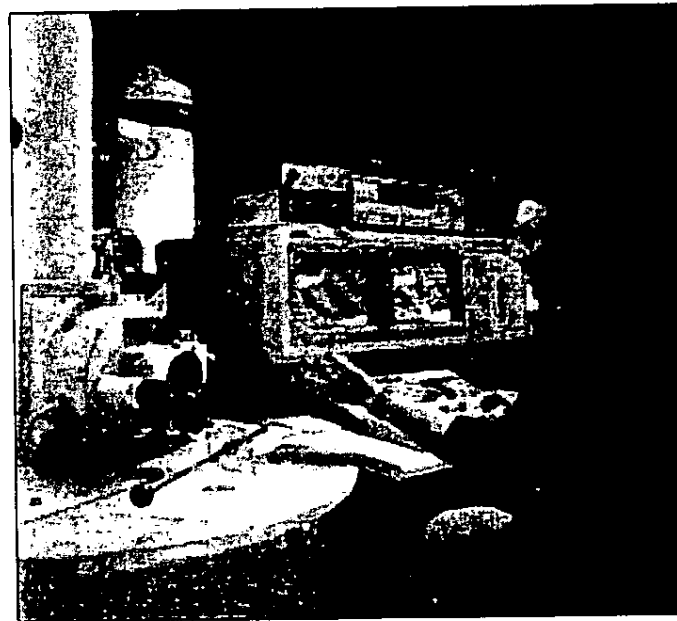
Marketplace Trends

The renewable energy industry involves many political, economic, environmental, and technological factors that interact with

each other to influence marketplace trends. It is helpful to understand some of these factors because an increase in the market for a certain technology can equal an increase in job opportunities.

There is currently a movement to restructure the power industry. Driven partially by the Energy Policy Act of 1992, the movement intends to provide customers with the opportunity to choose their power provider by decreasing regulation of and introducing competition among utilities. Restructuring is primarily occurring on a state-by-state basis.

Many companies that sell energy produced from renewable sources view the move toward utility restructuring as a great opportunity. In fact, in many states, restructuring has given rise to the glimmerings of a new industry—*green power marketing*. The concept of green power marketing is based on the assumption that consumers will choose and pay more for renewable energy products/services that reflect their environmental values. Green power marketing programs put a price on the environmental value of a product to overcome the cost barrier that has historically limited the generation of renewable energy on a large scale.



Jim Yost Photography, NREL/P1002021

Leading the United States toward a sustainable energy future requires workers with many different degrees and types of training.



This document was produced for the U.S. Department of Energy (DOE) by the National Renewable Energy Laboratory (NREL), a DOE national laboratory. The document was produced by the Information and Outreach Program at NREL for the DOE Office of Energy Efficiency and Renewable Energy. The Energy Efficiency and Renewable Energy Clearinghouse (EREC) is operated by NCI Information Systems, Inc., for NREL / DOE. The statements contained herein are based on information known to EREC and NREL at the time of printing. No recommendation or endorsement of any product or service is implied if mentioned by EREC.

There are a wide variety of professions available in the renewable energy industry.

Green marketing pilot programs show that the demand for renewable power products in a competitive marketplace may be quite large. Consumer demand for green power—along with the progress of utility restructuring and proposed state and federal mandates/incentives for consumers and utilities to purchase green power—could substantially strengthen the renewable power industry. This, in turn, may further decrease costs of renewable power and increase the number of jobs available in the renewable energy industry.

In addition to domestic markets, international markets for renewable energy systems are growing. International markets are driven by large remote needs for electricity, growing environmental concerns, and in some cases, a limited availability of fossil fuels.

Job Opportunities

There are a wide variety of professions available in the renewable energy industry. This fact can make it challenging to find the right professional niche, but it also provides the opportunity for individuals with many different types and degrees of training to get involved with renewable energy.

Some jobs—such as those in communications, community outreach, sales/marketing, and business support (e.g., corporate planning and finance, accounting, human resources, law, and information technology)—can be found in almost every renewable energy field. Other jobs are specific to individual renewable energy technologies, as shown



Warren Greiz, NREL/PX02131

A certification test engineer measures the noise from a wind turbine.

in the following discussion of the five main renewable energy power sources: wind, solar, bioenergy, geothermal, and hydropower.

Wind Power

People have been using energy from the wind for hundreds of years. Windmills have been used for pumping water or grinding grain. And today, the windmill's modern equivalent—a *wind turbine*—can use the wind's energy to generate electricity. A single, small- or intermediate-sized wind turbine can generate enough electricity to power a house or farm, while a number of large, utility-scale wind turbines can form *wind plants* or *wind farms* that generate enough electricity for tens of thousands of homes.

As the cost of generating electricity from wind power continues to fall, many electricity providers are starting to view wind as an attractive, renewable alternative to fossil fuels (such as coal and natural gas), which are not renewable. The wind industry has grown at a rate of 25 percent per year, making wind power the fastest-growing source of electricity-generation in the world during the 1990s. Although Europe has experienced the majority of growth in the wind industry, the United States installed 905 megawatts (MW) of capacity in 1999—a record year for new wind projects. The nation's total wind capacity reached 2500 MW in December 1999 and is expected to approach 5000 MW by the end of 2001.

Jobs in Wind Power

The wind industry employs both professional and skilled workers in a number of different capacities. New wind projects require people with business, meteorological, and engineering experience to plan and build projects. Meteorologists help engineers identify appropriate sites with suitable wind conditions. Engineers then design the wind plant, working with the utility companies and communities. Construction workers are needed to build the wind plant. And mechanical and electrical technicians, called "windsmiths," are required to operate and maintain the wind turbines.



Warren Greitz, NREL/PX09150

Scientists are needed to research and develop renewable energy technologies.

The growing demand for reliable electricity internationally has contributed to the growth of the U.S. PV industry.

Both industry and research laboratories constantly try to improve the design and efficiency of wind turbines. These research and development (R&D) groups generally employ mechanical, electrical, and aeronautical engineers with advanced degrees, as well as experienced technicians. However, others with technical backgrounds may also find jobs.

Solar Power

Anyone who has visited Florida in July knows that the sun can produce heat. And in 1839, French physicist Edmund Becquerel discovered that sunlight could also produce electricity (known as the *photoelectric effect*). Knowledge of the sun's ability to produce both heat and electricity has led to the invention of numerous technologies for capturing the sun's energy. The most common technologies produced and used in the United States today include photovoltaics, concentrating solar power (also known as solar thermal electric) systems, solar hot water systems, and passive solar building design.

Photovoltaics

Photovoltaic (PV) cells, also known as solar cells, produce electricity directly from sunlight. When a PV cell is exposed to the sun, the cell, which is made of semiconductor materials, absorbs a portion of the light that strikes it. If the energy from the absorbed light strikes electrons in the outer shell of an atom, these electrons are freed from their parent atoms. Free electrons can then travel into a circuit in the form of electricity. PV cells can be hooked together to meet many different types of electricity requirements, from pumping water to operating calculators and watches, and lighting homes and communities.

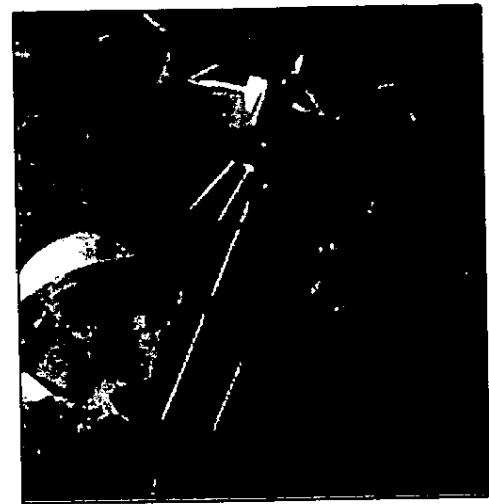
PV has traditionally been used in locations where it is expensive or impossible to send electricity through power lines. An increasing number of utility companies are experimenting with using PV to fill their small or more expensive power needs. Some homeowners and commercial building owners are integrating PV systems into their building designs to offset utility power demand and improve power reliability.

The growing demand for reliable electricity internationally has contributed to the growth of the U.S. PV industry—approximately 70 percent of PV systems manufactured in the United States are sold to other countries.

Concentrating Solar Power

Although the mechanics of each method differs, all three concentrating solar power (CSP) technologies—parabolic troughs, power towers, and parabolic dishes—use mirrors to focus incoming sunlight onto a receiver. The receiver collects the sun's energy in the form of heat, which can then be used directly or converted into electricity using a generator.

These technologies are currently in different stages of development. Troughs have a proven track record as a technology that can function effectively for large-scale power needs (such as those of a utility company) and are currently the least expensive way to produce solar electricity. Power towers have also demonstrated an ability to function on a large, utility scale, while parabolic dish systems, still under development, show promise for small-scale projects.



Warren Greitz, NREL/PX02336

A technician works on a concentrating solar power collector.

CSP technologies have caught the attention of some U.S. utility companies, as well as others interested in tapping into the projected consumer demand for green power supplies, even though the cost of using these technologies to generate electricity is still somewhat high.

Solar hot water systems are increasingly being installed in schools, hospitals, prisons, and other government facilities across the country.

Solar Hot Water

Energy from the sun can also be used to heat water for buildings and swimming pools. Solar water heating systems for buildings typically include a *solar collector*, in which fluid is heated by the sun, and a *storage tank*, which holds the hot fluid after it has been heated by the collector. Systems using fluids other than water require the additional step of passing water through a *heat exchanger* to heat the water. Swimming pool systems are very simple; they generally consist of collectors made of black plastic or rubber through which pool water is pumped to be heated.

Advances in solar hot water technology for buildings have dramatically cut the cost of solar water heaters from about \$.20 per kilowatt-hour (kWh) in 1980 to \$.08 to \$.10 per kWh in 2000. As a result, solar hot

water systems are increasingly being installed in schools, hospitals, prisons, and other government-owned facilities across the country. However, the number of solar hot water systems purchased in the United States is still quite small compared to the number purchased in the rest of the world. In 1997, for example, Americans purchased approximately 25,000 systems. Of the systems purchased, the majority were for heating residential swimming pools.

Passive Solar Building Design

Building orientation, types of construction materials, glass selection, and architectural features all affect the overall energy performance of a building. For a passive solar building, designers consider these features early in the design process along with taking advantage of solar energy to heat and

light a building. They also design the building to be cool in summer.

It may cost more to design a passive solar building, but the savings achieved from decreasing the size of the mechanical and electrical systems to heat/cool and light the building, as well as energy cost savings, more than make up the difference.

Jobs in Solar Power

Growth of the solar power industry creates high-wage, skilled jobs throughout the country for individuals with many different types of training. R&D groups at national laboratories, universities, and private companies develop and continually improve solar products to lower their costs and improve their reliability. Individuals employed in solar R&D generally have professional degrees in electrical, mechanical, and chemical engineering; materials science, and/or physics. Many of the people involved with technologies that are still under development, such as parabolic dish systems, focus on R&D.

As each technology progresses from the R&D phase toward full-scale commercialization, an increasing number of both professional and skilled workers are needed to sell, manufacture, design, install, and maintain equipment. The PV and solar hot water industries currently employ the majority of these workers, including electricians, engineers, technicians, and technical managers. As utility-scale CSP technologies become commercially viable, the CSP industry will eventually require an increasing number of these workers, as well as engineers and construction workers to design and build power plants. The passive solar industry involves many of these professions as well, but also employs architects and builders.

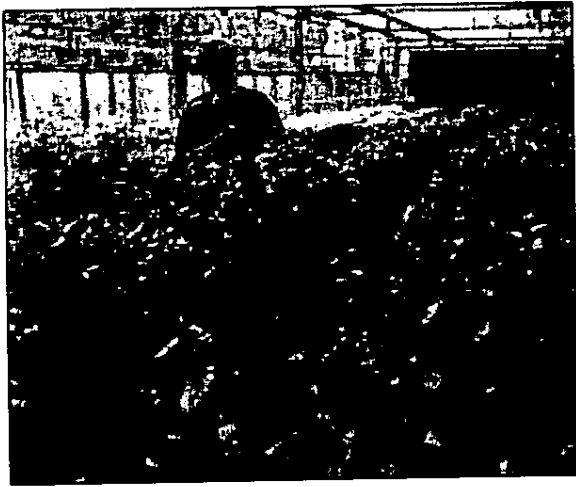
Bioenergy

The energy stored in *biomass* (organic matter) is called *bioenergy*. People have been burning biomass, such as trees and straw, to cook and warm themselves for thousands of years. Today we not only heat 25 million homes with wood, we also produce 10.2 billion watts of electricity (less



Warren Greitz, NREL/PX07154

Some architects specialize in passive solar building design.



Warren Greiz, NREL/P1X00284

Farmers and foresters grow energy crops for biofuel and biopower production.

than 1 percent of what we use as a nation) from wood waste and waste from other biomass. And we derive up to 0.4 percent of all our transportation fuels (about 1.5 billion gallons) from corn, which is used to produce ethanol.

While we have always used wood and other biomass for heat, the pro-

duction of electricity and fuels has grown from virtually nothing 20 years ago to what it is today, helping bioenergy become second only to hydropower as the largest source of renewable energy in the world. In addition, we use biomass instead of petroleum to produce between 11 to 15 billion pounds of consumer products, including plastics, glues, furniture, paints, and chemicals.

But as bioenergy technologies and biobased products stand poised to help achieve energy independence for our nation, the conversion of biomass into fuels and products still remains more difficult than the processes used for petroleum or coal.

Jobs in Bioenergy

Universities, national laboratories, and industry are working together to find solutions to the difficult problems surrounding the production and use of biomass for energy and products. These R&D efforts require chemists, agricultural specialists, microbiologists, biochemists, and engineers, just to name a few.

Biofuel, biopower, and biobased product plants are most cost-effective when located near their source of biomass. Thus, bioenergy industry development has a special appeal because it creates direct and indirect jobs in rural areas of the country, and may prove to be a profitable complement for many existing agricultural and forestry businesses.

Engineers and construction workers are needed to design and build bioenergy plants, while electrical/electronic and mechanical technicians, engineers (mechanical, electrical, and chemical), mechanics, and equipment operators are needed to run and maintain these plants. Some may even require individuals cross-trained in areas such as engineering and biology, or chemistry and agriculture.

Jobs in bioenergy today cut across a wide spectrum of specialties and skills. And if R&D and industrial efforts succeed in making bioenergy more commercially profitable, we may see a dramatic increase in the number of bioenergy-related jobs. We'll need more farmers and foresters to produce and harvest biomass resources, more truckers to transport the resources to the power and fuel plants, and more operators to run facilities.



David Parsons, NREL/P1X00681

A worker operates equipment at a generating station that burns wood to produce electricity.

Geothermal Energy

Heat from the earth, called geothermal energy, is yet another renewable energy resource that people have used over the years. Geothermal energy heats water seeping into underground reservoirs, which can then be tapped for a variety of uses.

If R&D and industrial efforts succeed in making bioenergy more profitable, we may see a dramatic increase in the number of bioenergy-related jobs.



David Parsons, NREL/PX01572

A worker monitors equipment operation at a geothermal power plant.

Low to medium temperature (70° to 225°F) water reservoirs can be used directly to heat buildings, grow and dry crops, melt snow on sidewalks, and for fish farms. This is called the *direct use* of geothermal energy. The energy produced from high temperature reservoirs (225° to 600°F) can spin a turbine to generate electricity.

Current drilling technology limits the development of geothermal resources to relatively shallow, water- or steam-filled reservoirs, most of which are found in the western part of the United States. Researchers are developing new technologies for capturing the heat in the deeper, "dry" rocks, which would support drilling almost anywhere.

Geothermal heat pumps (GHPs) allow us to take advantage of the Earth's constant temperature (around 55°F) just a few yards beneath the surface to heat and cool buildings, and to produce hot water. GHPs transfer heat between the building and the ground by circulating fluid through underground pipes. Currently, the majority of GHPs produced in the United States are purchased domestically, primarily in the Midwest. But as technology improvements reduce the costs of installing GHPs, the demand for this technology will continue to grow throughout the country.

Jobs in Geothermal Energy

The geothermal industry employs both skilled workers and those with professional degrees.

Developing hot water reservoirs requires geologists, geochemists, geophysicists, hydrologists, reservoir engineers, mud loggers, hydraulic engineers, and drillers to locate, assess, and access the reservoirs.

Environmental scientists prepare environmental impact studies, and permit and leasing specialists obtain the land rights.

Geothermal direct-use technologies create jobs for heating engineers, and in the building and agricultural industries. For electricity production, engineers (electrical and mechanical) and construction workers—along with electrical technicians, electricians, electrical machinists, welders, riggers, and mechanics—are needed to design and construct power plants.

Mechanical engineers, geologists, drilling crews, and heating, ventilation, and air conditioning contractors are needed to manufacture and install GHPs. In addition, mechanical and electronic engineers, geologists, chemists, and materials scientists are required for ongoing R&D.



Warren Greitz, NREL/PX05883

A fish farmer uses a net to catch fish, which are raised in geothermally heated waters.

Hydropower

Hydropower, which uses the energy of flowing water to produce electricity, is the largest and least expensive source of renewable energy produced in the United States today. In fact, hydropower now generates approximately 10 percent of the electricity used in our country (wind, solar, geothermal, and biomass combined produce less than 1 percent). Most hydropower projects use a dam and a reservoir to retain water from a river. When the stored water is released, it passes through and rotates turbines, which spin generators to produce electricity.

The geothermal industry employs both skilled workers and those with professional degrees.

The hydropower industry now also employs environmental scientists to assess environmental impacts and address environmental remediation.

Water stored in a reservoir can be accessed quickly for use during times when the demand for electricity is high. Other hydropower plants, called "run of the river" projects, do not require dams. Instead, a portion of a river's water is diverted into a canal or pipe to spin turbines.

Many large-scale dam projects have been criticized for altering wildlife habitats, impeding fish migration, and affecting water quality and flow patterns. As a result of increased environmental regulation, the National Hydropower Association forecasts a decline in hydropower use through 2020. R&D efforts have succeeded in reducing many of these environmental impacts through the use of fish ladders (to aid fish migration), fish screens, new turbine designs, and reservoir aeration. Although funding has been limited, current research focuses on the development of a "next generation turbine," which is expected to further increase fish survival rates and improve environmental conditions.

Jobs in Hydropower

As with many of the other renewable energy technologies, the design, construction, and maintenance of hydropower plants requires electrical and mechanical engineers, technicians, and skilled workers. If the hydropower project also

involves managing the reservoir and the surrounding land, the developer will also hire recreation planners, resource managers, and educators. In addition, state and federal licensing laws now require current or prospective hydropower plant developers to assess the environmental effects of their operation. Thus, the hydropower industry now also employs environmental scientists (biologists, hydrologists, ecologists, and wildlife habitat specialists, for example) to assess environmental impacts and address environmental remediation. Environmental scientists, as well as engineers, also participate in R&D efforts through private companies, national laboratories, and universities.

A career in renewable energy is a valuable way for individuals with a wide range of skills and interests to help guide the United States toward a secure, environmentally conscious energy future. For more information on energy careers, specific renewable technologies, and market forecasts, consult the resource list below.

Resources

The following resources may provide more information on renewable energy technologies and careers. This list does not cover all the available resources on renewable energy technologies and careers, nor is the mention of any resource to be considered a recommendation or endorsement.

Energy Efficiency and Renewable Energy Clearinghouse (EREC)

P.O. Box 3048
Merrifield, VA 22116
Phone: 1-800-DOE-EREC (1-800-363-3732)
Fax: (703) 893-0400
E-mail: doe.erec@nciinc.com
Web site: <http://www.eren.doe.gov/consumerinfo/>

Provides free general and technical information to the public on the many topics and technologies pertaining to energy efficiency and renewable energy.

Organizations

American Bioenergy Association

1001 G. Street, N.W., Suite 900 E.
Washington, D.C. 20001
Web site: <http://www.biomass.org/>

Promotes the economic and environmental benefits of biomass utilization.

American Solar Energy Society (ASES)

2400 Central Avenue, Suite G-1
Boulder, CO 80301
Phone: (303) 443-3130
Fax: (303) 443-3212
E-mail: ases@ases.org
Web site: <http://www.ases.org/>

A solar energy information source for everyone, from homeowners to public officials.

(Continued on page 8)

(Continued from page 7)

American Wind Energy Association (AWEA)

122 C. Street, N.W., Suite 380
Washington, D.C. 20001
Phone: (202) 383-2504
Fax: (202) 383-2505
E-mail: windmail@awea.org
Web site: <http://www.awea.org/>

Advocates the development of wind energy.

Energy Information Administration (EIA)

U.S. Department of Energy
ER-30
1000 Independence Avenue, S.W.
Washington, D.C. 20585
Phone: (202) 586-8800
E-mail: infctr@eia.doe.gov
Web site: <http://www.eia.doe.gov>

Provides energy data and analyses to assist businesses, government, and the public in understanding energy issues.

Environmental Careers Organization

179 South Street
Boston, MA 02111
Phone: (617) 426-4375
Web site: <http://www.eco.org/>

Works to enhance the development of environmental careers through internships, career advice, career products, and research and consulting.

Geothermal Education Office

664 Hilary Drive
Tiburon, CA 94920
Phone: 1-800-866-4436
Fax: (415) 435-7737
E-mail: geo@marin.org
Web site: <http://geothermal.marin.org/>

Along with other educational resources, offers useful information on geothermal careers.

Geothermal Energy Association (GEA)

209 Pennsylvania Avenue, SE
Washington, D.C. 20003
Phone: (202) 454-5261
Fax: (202) 454-5256
E-mail: geo@geo-energy.org
Web site: <http://www.geo-energy.org/>

A trade association of U.S. companies who support the expanded use of geothermal energy.

Geothermal Resources Council (GRC)

P.O. Box 1350
2001 Second Street, Suite 5
Davis, CA 95617-1350
Phone: (530) 758-2360
Fax: (530) 758-2839
E-mail: grc@geothermal.org
Web site: <http://www.geothermal.org/index.html>

Serves as a focal point for the continuing professional development of its members.

National Hydropower Association (NHA)

1 Massachusetts Avenue, N.W., Suite 850
Washington, D.C. 20001
Phone: (202) 682-1700
Fax: (202) 682-9478
E-mail: info@hydro.org
Web site: <http://www.hydro.org/>

Seeks to secure hydropower's place as a reliable and renewable energy resource that serves national environmental and energy policy objectives.

Renewable Fuels Association

1 Massachusetts Avenue, N.W., Suite 820
Washington, D.C. 20001
Phone: (202) 289-3835
Fax: (202) 289-7519
E-mail: info@ethanolrfa.org
Web site: <http://www.ethanolrfa.org/>

Works to expand the production and consumer use of renewable fuels.

Solar Energy Industries Association (SEIA)

1616 H. Street, N.W., 8th floor
Washington, D.C. 20006-4999
Phone: (202) 628-7745
Fax: (202) 628-7779
Web site: <http://www.seia.org/main.htm>

Puts out information on solar careers approximately every three years and sometimes posts employment opportunities on its Web site.

Web sites

Energy Career Guide

Energy Education Online
Web site: <http://www.energyed.ecw.org/career.html>

Provides information on energy careers, schooling, employers, and books.

Energy Efficiency and Renewable Energy Network (EREN)

U.S. Department of Energy
Web site: <http://www.eren.doe.gov/>

Provides access to hundreds of links and thousands of documents on energy efficiency and renewable energy topics.

Occupational Outlook Handbook


U.S. Department of Labor
Superintendent of Documents
P.O. Box 371954
Pittsburg, PA 15250-7954
(202) 512-1800
Web site: <http://stats.bls.gov/ocohome.htm>

Provides general information on a wide variety of careers, including those in renewable energy. A hard copy may be ordered by calling the phone number or writing to the address above.

Solstice

Center for Renewable Energy and Sustainable Technology (CREST)
Web site: <http://solstice.crest.org/index>

Contains general renewable energy resources, including a directory of energy-related graduate school programs.



University of Alaska - Preparing Alaskans for jobs and careers

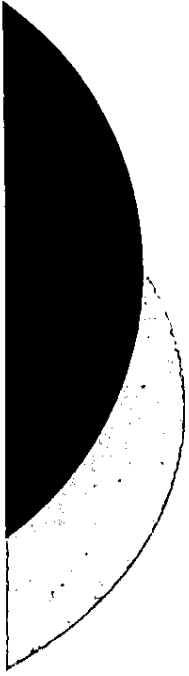
Fran Ulmer

February 18, 2009



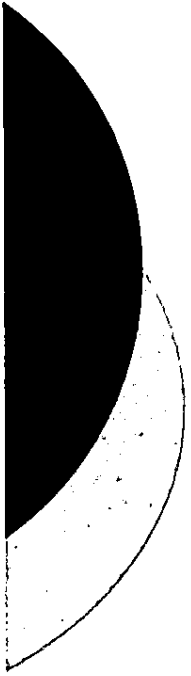
Green Jobs Potential: National

- The U.S. Conference of Mayors released a report in early October 2008 that finds the U.S. economy currently generates more than 750,000 green jobs, while over the next 30 years, an emphasis on clean energy could cause that number to grow five-fold, to more than 4.2 million jobs.
- Engineering, legal, research, and consulting jobs currently dominate the green jobs in the United States and could grow by 1.4 million by 2038, while renewable electricity production will create 1.23 million jobs, alternative transportation fuels will add 1.5 million jobs, and building retrofits will create another 81,000 jobs.



University of Alaska Anchorage Catalyst for Green Industry Jobs

- ***University of Alaska Anchorage significant role:***
 - **UAA as Trainer** – supply of skilled graduates
 - **UAA as Innovator** – transfer of knowledge
 - **UAA as Partner** – provides technical expertise to sponsored research; commercialize product; licensing activities;
 - **UAA as Facilitator** – facilitate networking between public/private sector



Role of University: Trainer

- Clearly if America is to rise to the global energy challenge, and capture the economic opportunity it represents, we need to adequately prepare our students.
 - Nationwide, college graduates earn +/- 40% more than non-educated
 - Education directly associated with quality of life, community involvement, civic engagement, reduction in social impacts

www.uaa.alaska.edu/ctc

Career Pathways to a Bright Future

Ongoing

4-5 years
Bachelor's Degree

3-3 years
Associate Degree

1-2 years
Certificate

Up to 5 years
Certificate

Postsecondary
High School Preparation of

LIAA

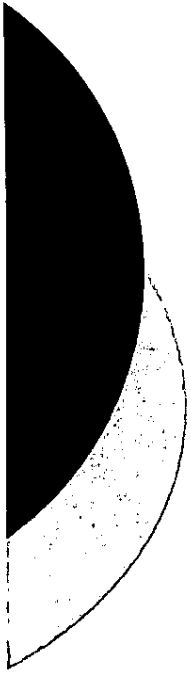
<p>Allied Health 700-710</p> <p>Aviation Technology 700-720</p> <p>Computer and Information Technology 700-730</p> <p>Construction & Electrical Technology 700-740</p> <p>Health & Biotechnology 700-750</p> <p>Information & Business Technology 700-760</p> <p>Manufacturing & Logistics 700-770</p> <p>Maritime 700-780</p> <p>Public Safety 700-790</p> <p>Transportation 700-800</p>	<p>Business Administration 700-810</p> <p>Business Management 700-820</p> <p>Business Administration 700-830</p> <p>Business Administration 700-840</p> <p>Business Administration 700-850</p> <p>Business Administration 700-860</p> <p>Business Administration 700-870</p> <p>Business Administration 700-880</p> <p>Business Administration 700-890</p> <p>Business Administration 700-900</p>	<p>Business Administration 700-910</p> <p>Business Administration 700-920</p> <p>Business Administration 700-930</p> <p>Business Administration 700-940</p> <p>Business Administration 700-950</p> <p>Business Administration 700-960</p> <p>Business Administration 700-970</p> <p>Business Administration 700-980</p> <p>Business Administration 700-990</p>	<p>Business Administration 700-1000</p> <p>Business Administration 700-1010</p> <p>Business Administration 700-1020</p> <p>Business Administration 700-1030</p> <p>Business Administration 700-1040</p> <p>Business Administration 700-1050</p> <p>Business Administration 700-1060</p> <p>Business Administration 700-1070</p> <p>Business Administration 700-1080</p> <p>Business Administration 700-1090</p> <p>Business Administration 700-1100</p>
---	---	---	--

For more information, visit www.uaa.alaska.edu/ctc or call 907-475-2000. This information is for informational purposes only and does not constitute an offer of admission. Admission is subject to review and approval by the University of Alaska.



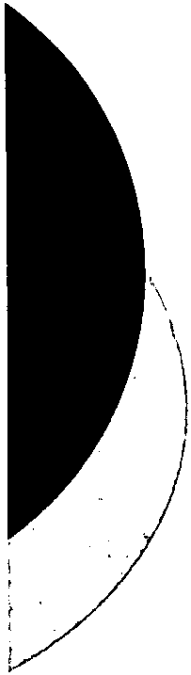
Role of University: Innovator

- Research and innovation are the building blocks for new industry development.
 - *52 percent of all research and development activity in the state come from the UA system*
 - *Education and research are symbiotic – the training of the next generation of innovators is best done in a university setting*
 - *Technology transfer is a natural act of all universities – students transferred to industry each year*



Role of University: Partner

- Partnerships between the public and private sectors and universities are critical to success of economic growth strategies.
 - *State of Alaska*
 - *Federal agencies – EDA, USDA*
 - *Alaska Renewable Energy Project*
 - *Alaska Regional Development Organizations*
 - *Denali Commission*
 - *Rasmuson Foundation*
 - *Alaska State Chamber - Chambers of Commerce*



Role of University: Facilitator of Entrepreneurship

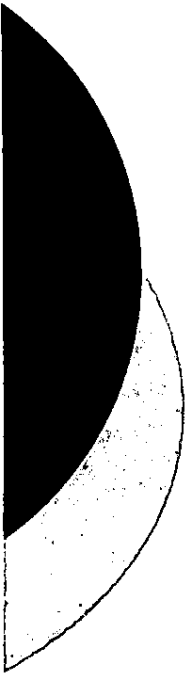
- An SBA study observed that, “Innovation without entrepreneurship generally yields minimal local economic impact...innovations are highly portable, whereas entrepreneurship is people/place-based.” It’s typically the entrepreneur that converts innovation into economic development.*
- Robert Litan, VP of Research & Policy at Kauffman Foundation on current economic crisis:
 - “E=R or Entrepreneurship = Recovery”
- Programs of the UA System that support entrepreneurship
 - Center for Economic Development
 - Small Business Development Center
 - Village Income Tax Program

*Source: Council on Competitiveness 2007



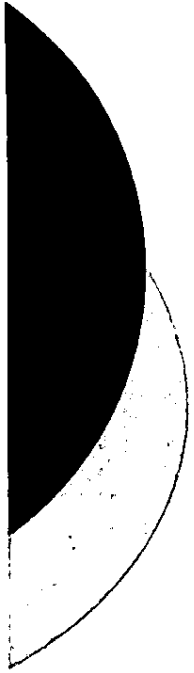
Institutes and Centers - UAA

- **ISER - <http://www.iser.uaa.alaska.edu/>**
Conducts non-partisan research that helps Alaskans and others to understand social and economic systems and supports informed public and private decision making.
- **Center for Economic Development - <http://ced.uaa.alaska.edu/contact.htm>**
Leverages the resources of the UA campuses to facilitate economic development in communities throughout the state of Alaska.
- **Alaska Small Business Development Center – www.aksbdc.org/**
Provide small business with free and confidential counseling.
- **Center for Economic Education – <http://www.cee.uaa.alaska.edu/default.asp>**
- **University of Alaska Corporate Programs - <http://www.alaska.edu/uacp/>**
An educational organization established to serve the training and education needs of business and industry.



Institutes and Centers - UAF

- **Cooperative Extension Service – <http://www.uaf.edu/ces/>**
Extends relevant research-based knowledge in an understandable and usable form; and to encourage the application of this knowledge to solve the problems and meet the challenges of Alaska.
- **Agricultural and Forestry Experiment Station**
- **Alaska Center for Climate Assessment and Policy**
- **Alaska Climate Research Center**
- **Center for Global Change and Arctic System Research**
- **Cold Climate Housing Research Center**
- **Geophysical Institute**



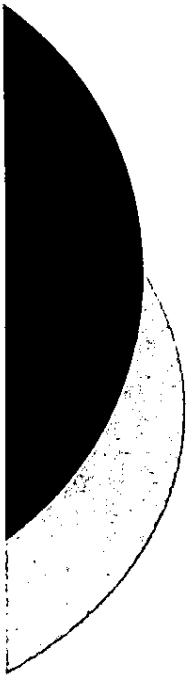
Institutes and Centers - UAS

- **Masters of Business Administration – Distance Delivery**

This program teaches business skills and links professional peers having a variety of backgrounds and experience with students.

- **Masters of Public Administration**

This program teaches relevant skills to both public and private non-profit entities. The program provides leadership and management training in policy development, as well as organizational, human resource and budgetary areas.



Conclusion

University of Alaska Anchorage serves a significant role in development of the green economy and green jobs by:

- Providing a well-educated, highly skilled work force
- Engaging in cutting edge, innovative research
- Fostering technology/innovation transfer to industry
- Developing effective public private partnerships
- Launching start-up enterprises through entrepreneurial support programs

APICC Priority Occupations Report 2008 Indicators: Difficult to find qualified workers to hire in this occupation and positions often remain vacant for periods of time.	AK DOL HOT Jobs 2004—2014 Indicators: % growth greater than all occupations as a whole; grow at least 75 jobs over 10 years; rank in top 2 wage quartiles.	AK DOL Focus Jobs 2004—2014 Indicators: Top 25 occupations with most openings, with higher than average wages.	AGIA Training Strategic Plan A Call to Action Indicators: Occupations considered significant in constructing a natural gas pipeline.	UAA Programs Connected to Demand
STEM	STEM	STEM	STEM	STEM
Chemical Engineers <Bachelor's> \$70K +			Chemical Engineers	
Civil Engineers <Bachelor's> \$70K +	Civil Engineers		Civil Engineers and Technicians	SOE: Civil Engineering, BSE
Electrical Engineers <Bachelor's> \$70K +			Electrical and Electronic Engineers and Technicians	SOE: Electrical Engineering, BSE
Mechanical Engineers <Bachelor's> \$70K +	Mechanical Engineers		Mechanical Engineers and technicians	SOE: Mechanical Engineering, BSE
Mining Engineers <Bachelor's> \$70K +				
Project Engineers <Bachelor's> \$70K +	Engineering Managers		Engineering Managers	SOE: Engineering and Science Management, MS
Project Managers <Bachelor's> \$70K +	Construction Manager	Construction Managers	Construction Managers	SOE: Project Management, MS CTC: Construction Management, BS
Operations	General Operations	General & Operations		SOE: Project Management,

Managers/Supervisors <Bachelor's> \$70K +	Manager	Manager		MS CTC: Construction Management, BS
	Environmental Scientists, including health		Materials Engineers Environmental Engineers and technicians, environmental science and protection technicians, environmental scientists Safety: Health/safety engineers Occupational health and safety specialists, hazardous materials removal, health and safety engineers, OHS specialists and technicians, security guards	SOE: Applied Environmental Science and Technology, AEST Environmental Quality Engineering Science, MS KPC; Occupational Safety and Health, AAS
			Drafters, engineering technicians, inspectors, mechanical drafters, surveying and mapping technicians, landscape architects	SOE: Geomatics, BS, AAS, and cert CTC: Architectural Engineering and Technology, AAS and certs
Education	Education	Education	Education	Education
		Elementary Teachers, except special ed		COE: Teacher Ed.
		Secondary Teachers, except specials & voc ed		COE: Teacher Ed - MAT
	Postsecondary Teachers			
	Instructional Coordinators			
	Ed, Voc, and School Counselors			COE: Counselor Education
	Special Ed Teachers, Preschool, Kindergarten,			COE: Early Childhood Development, Special Ed,

	Elementary			Elementary Ed.
Business/Finance	Business/Finance	Business/Finance	Business/Finance	Business/Finance
	Accountants/Auditors	Accountants/Auditors		CBPP: Accounting, BBA and AAS
Administrative Managers/Supervisors <Bachelor's> \$50K +	Administrative Service Managers	Administrative Service Managers		CBPP: MBA, Management, BBA
	Chief Executives	Chief Executives		CBPP: MBA, Management, BBA
	Financial Manager	Financial Managers		CBPP: Finance, BBA
		First Line Supervisors: Office/Retail/Construction/Mechanics/Installers	First Line Supervisors	CBPP: Management, BBA
	Property, Real Estate, Community Assoc Mgrs			
	Sales Manager			CBPP: Marketing, BBA
	Marketing Mgrs			CBPP: Marketing, BBA
	Loan Officers			CBPP: Finance, BBA
	Securities, Commodities, Financial Services Sales Agents			CBPP: Finance, BBA
			Material Handling: First line Supervisors, Freight handling, order clerks, stock clerks	CBPP: Cert in Logistics
			Administration: Bookkeeping, accounting, budget analysts, cost estimators, placement specialists, admin assistants, file clerks, first line supervisors, HR assistants, payroll clerks, receptionists, training specialists	CBPP: Small Business Admin, AAS, Management, BBA

Information Technology	Information Technology	Information Technology	Information Technology	Information Technology
	Computer System Analyst			CTC; Computer Networking, AAS
	Computer Information Systems Mgrs			CBPP : Management Information Systems, AAS
	Network and Computer Systems Administrators			CTC: Computer Networking and CISCO Academy, AAS and Cert
			Computer systems mgrs, computer programmers, computer support specialists, systems analysts, database administrators	CTC: Computer Information Office Systems and Computer Networking, CISCO Academy, AAS and Certs KPC/Mat Su: Varied computer courses and certs
Transportation	Transportation	Transportation	Transportation	Transportation
Heavy Truck Drivers <Driver's License/Endorsements> \$50K +		Truck Drivers, Heavy and Tractor-trailer	Truck Drivers, Heavy and Tractor-trailer	
		Automotive Service Technicians	Bus/Truck Mechanics and Diesel Engine Specialists	CTC: Automotive and Diesel Technology, AAS and Certs
		Aircraft Mechanics		
		Airline Pilots, Copilots, and Flight Engineers		CTC: Aviation Technology – Professional Piloting, BA
			Logistics: Drivers, dispatchers, purchasing agents	CBPP: Cert in Logistics
Health	Health	Health	Health	Health
		Registered Nurse		CHSW: Nursing, AAS and BS
	Child, Family, School			CHSW: Social Work, MS

	Social Workers			and BS
	Physicians and Surgeons			CAS: WWAMI
	Social and Community Service Mgrs			CHSW: Social Work, MS and BS
	Medical and Health Services Mgrs			CTC: Medical Assisting, AAS and Cert
	Substance Abuse and Behavioral Disorder Counselors			CHSW: Human Services, AAS, and BS, Social Work, BS
	Pharmacists			CTC: Pharmacy Technology, Cert
	Physical Therapists			
	Mental Health Counselors			
Public Safety	Public Safety	Public Safety	Public Safety	Public Safety
		Police Officers/Patrol Officers		
AAS/Apprenticeship/OJT	AAS/Apprenticeship/OJT	AAS/Apprenticeship/OJT	AAS/Apprenticeship/OJT	AAS/Apprenticeship/OJT
Electrical Inspectors <AAS or Bachelor's> \$60-\$100K				PWSCC: Industrial Technology – electrical power generation, AAS and cert
Mechanical Inspectors <AAS or Bachelor's> \$60K +				
Non Destructive Examination <AAS or Bachelor's> \$60K +				CTC: Non Destructing Testing, AAS and Cert
H and S Compliance <AAS or Bachelor's> \$60-\$100K				KPC: Occupational Safety and Health, AAS PWSCC: Industrial Technology – safety, AAS and Cert

Machinist & Millwrights <AAS or Apprenticeship or OJT> \$70K +			Millwrights	PWSCC: Industrial Technology –Millwright, AAS and vcert KPC: Process Technology, AAS
Maintenance General/Mining Mechanic <AAS or Apprenticeship or OJT> \$AAS or Apprenticeship or OJT>		Maintenance & Repair Workers		
Cleaners <HS diploma/GED> \$?				
Carpenters <Apprenticeship or training/OJT> \$50K +		Carpenters	Carpenters	
Electricians <Apprenticeship or training/OJT> \$70K +		Electricians	Electricians	
Pipe Fitters <Qualified Welder with mathematical background> \$70K +		Plumbers, Pipe fitters, Steamfitters	Plumbers, Pipe fitters, steamfitters	
		Construction Equipment Operators		
		Sales Reps		
	Surveyors			SOE: Geomatics, BS, AAS and cert
			Crafts: Masons, Laborers, Crushing, Explosives, Fence, Helpers, highway maintenance, insulation, sheet metal, iron, painters	

			Welders	CTC/KPC: Welding, AAS and Cert
			Equipment Operators	
			Operations: Gas Compressor operators, gas plant operators, plant and system operators	KPC: Process Technology PWSCC: Industrial Technology, AAS and Certs
			Camps/Catering: Cooks, dishwashers, first line supervisors, food prep, food service, janitors, laundry, housekeeping, general repair	CTC: Culinary Arts, AAS and Cert

www.uaa.alaska.edu/cte

Career Pathways to a Bright Future



Recommended High School Preparation *†

1/2-1 year Occupational Endorsement Certificate

1-2 years Undergraduate Certificate

2-3 years Associate's Degree

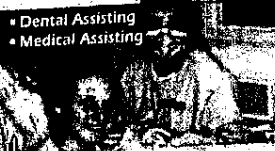
4-5 years Bachelor's Degree

Ongoing Professional Development

Allied Health
786.4346

- Algebra
- Biology
- Chemistry
- Computer skills
- Health/Health Occupations
- Reading and writing

- Clinical Assistant
- Coding and Billing
- Limited Radiography **
- Pharmacy Technology **
- Phlebotomist



- Dental Assisting
- Dental Hygiene
- Fire & Emergency Services
 - Emergency Medical Svcs
 - Fire Administration
 - Fire Suppression
 - Wildland Firefighting
- Medical Assisting
- Medical Laboratory Technology
- Radiologic Technology

- Fire Service Administration (Offered via distance learning through a partnership with Western Oregon University)
- Medical Technology

- Dental Assisting
- Dental Hygiene
- Massage Therapy
- Medical Assisting
- Medical Laboratory Technology
- Pharmacy Technology
- Radiologic Technology

Aviation Technology
264.7400

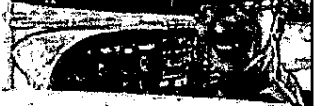
- Algebra II
- Computer skills
- Geometry
- Physics
- Reading and writing



- Aviation Maintenance Technology:
 - Airframe
 - Powerplant

- Air Traffic Control
- Aviation Administration
- Aviation Maintenance Technology
- Professional Piloting

- Aviation Technology:
 - Air Traffic Control
 - Aviation Management
 - Professional Piloting



Computer and Electronics Technologies
786.6423

- Algebra
- Computer skills
- Reading and writing

- Administrative Office Support
- Bookkeeping
- Cisco Local Academy Networking
- Desktop Publishing & Graphics
- Medical Office Support
- Office Technology
- Web Foundations

- Computer Information & Office Systems
- Computer & Networking Technology
- Telecommunications & Electronics Systems

- Computer Information & Office Systems
- Telecommunications, Electronics & Computer Technology

- Technology with or without a Business Emphasis

- Computer and Networking Technology
- Computer Information & Office Systems

Construction & Design Technology
786.6423

- Algebra
- Computer skills
- Construction or industrial technology elective
- Reading and writing

- Computer Aided Drafting and Design **

- Architectural Drafting
- Civil Drafting
- Industrial Welding Technology
- Mechanical & Electrical Drafting
- Nondestructive Testing Technology
- Structural Drafting

- Apprenticeship Technologies
- Architectural & Engineering Technology
- Construction Management
- Welding & Nondestructive Testing Technology

- Construction Management (planned to start Fall 2007)
- Technology with or without a Business Emphasis

- Architectural & Engineering Technology
- Construction Management
- Welding & Nondestructive Testing Technology

Health, Physical Education & Recreation
786.4083

- Algebra II
- Biology
- Computer skills
- Health
- Nutrition
- Reading and writing
- Variety of physical activities

- Coaching Leadership
- Fitness Leadership



- Culinary Arts

- Hospitality & Restaurant Management (senior year taken at NAU or UNLV)
- Nutrition Minor

- Minors (as part of a degree in a different field):
 - Adventure Leadership
 - Athletic Training
 - Coaching
 - Health & Fitness Leadership
 - Physical Education
- Physical Education
 - Health & Fitness Leadership Emphasis
 - Adventure Leadership Emphasis

- Culinary Arts
- Hospitality & Restaurant Management

- Various Health, Physical Education & Recreation Courses

Transportation and Power
786.1485

- Algebra
- Computer competency
- Industrial technology elective
- Reading and writing

- Automotive Brakes, Suspension & Alignment
- Automotive Electrical
- Automotive Engine Performance
- Automotive Power Trains

- Automotive Technology
- Heavy Duty Transportation & Equipment

- Automotive Technology
- Automotive Technology
 - Ford ASEET option
 - General Motors ASEP option
- Heavy Duty Transportation & Equipment

- Technology with or without a Business Emphasis

- Automotive and Diesel Technology

* This is a general list of recommended classes. Please contact the program advisor to find out more about your specific program. † Some of these classes have agreements with UAA that may allow you to earn college credit. Visit the tech prep website for more information: techprep.uaa.alaska.edu ** These programs are under development. Contact the departments that offer these programs for details.

Applied Environmental Science & Technology (M- & MS-AEST)



CAREERS WITH OPPORTUNITIES

The Applied Environmental Science & Technology (AEST) program is designed for students seeking careers as environmental professionals in the academic, regulatory, industrial, military, or consulting sectors. The program is interdisciplinary in nature, and encourages students to develop an understanding of environmental principles through advanced studies in biology, chemistry, geology, statistics, and environmental engineering.

Educational Pathway Options

Bachelor of Science (BS)

4-5 Years

In most instances, baccalaureate degrees in the physical sciences, life sciences, or engineering will provide a sufficient background to meet course prerequisites.

Graduate Certificate

1-2 Years

Port & Coastal Engineering

Master's Degrees

1-3 Years

Applied Environmental Science & Technology

- Master (M-AEST)
 - › Non-Thesis Option
- Master of Science (MS-AEST)
 - › Thesis Option

CAREER CONNECTIONS

- Science, Mathematics, Engineering, & Research
- Natural Resources & Environmental Sciences
 - Architecture & Construction
- Transportation, Distribution, & Logistics

APPLICATION PROCESS

ENROLLMENT SERVICES

- 1 Apply for admission at www.uaa.alaska.edu/admissions.
- 2 Submit official transcripts reflecting:
 - Completion of a bachelor of science degree from a regionally accredited institution.
 - Successful completion of at least one year of calculus and two consecutive semesters in two of the following: chemistry, physics, biology, or geology.
 - Minimum 3.0 GPA in natural/physical sciences or engineering.
- 3 Take the GRE and submit official test scores. Waiver available to applicants with significant professional experience.
- 4 TOEFL scores if applicable.
- 5 Contact 907.786.1900 for more information.

PROGRAM SPECIFIC

Submit to the School of Engineering

- Three letters of recommendation from people familiar with the applicant's technical aptitude
- One-page statement of career goals

The University of Alaska Anchorage has been continuously accredited by the Northwest Commission on Colleges and Universities since 1974. This brochure is for information purposes only and does not constitute a contract. UAA is an EO/AA employer and educational institution.

APPLIED ENVIRONMENTAL SCIENCE & TECHNOLOGY (M-AEST, MS-AEST)

Students are strongly recommended to contact a faculty advisor in the School of Engineering at 907.786.1900 prior to course selection.

1 BEGINNING THE PROGRAM

Upon admission to the AEST program, students will complete the following actions:

- Meet with an academic advisor prior to the start of classes to plan coursework for the first semester of study. The admissions committee will assign academic advisors, who will be identified in the acceptance letter received by successful applicants.
- Select a Graduate Studies Committee (GSC) consisting of three UAA faculty members – the chair of which is the assigned advisor. The GSC must be selected during the first semester of study.
- Prepare a Graduate Study Plan for approval by the GSC by the end of the first semester.

2 COMPLETE PROGRAM REQUIREMENTS (24-30 credits)

At least one course, with a grade of 'B' or better, in each of the core competency areas: analysis, biology, chemistry, environmental engineering, and geology. Remaining credits can be selected from the approved course list below. A minimum of 21 credits must be drawn from approved 600-level courses.

• Analysis

- STAT A402 Scientific Sampling (3)
- STAT A403 Regression Analysis (3)
- STAT A404 Analysis of Variance (3)
- STAT A405 Nonparametric Statistics (3)
- STAT A407 Time Series Analysis (3)
- STAT A408 Multivariate Analysis (3)
- STAT A601 Statistical Methods (3)
- STAT A620 Statistics for ESM (3)

• Biology

- BIOL A478 Biological Oceanography (4)
- BIOL A650 Advanced Microbial Ecology (3)
- BIOL A661 Advanced Molecular Biology (3)
- BIOL A675 Advanced Arctic Tundra Ecosystems (3)
- BIOL A685 Advanced Topics in Biology (1-5)

• Chemistry

- AEST A601 Aquatic Process Chemistry (3)
- CHEM A450 Environmental Chemistry (3)
- CHEM A634 Advanced Instrumental Methods (4)
- CHEM A641 Advanced Biochemistry I (3)
- CHEM A642 Advanced Biochemistry II (3)
- CHEM A698 Individual Research (1-9)

• Environmental Engineering

- AEST A602 Water Quality Management (3)
- AEST A603 Solid Waste Management (3)
- AEST A604 Environmental Law, Regulations and Permitting (3)
- AEST A608 Fundamentals of Air Pollution (3)
- AEST A613 Remediation (3)
- AEST A694 Environmental Law (3)
- CE A411 Introduction to Environmental Engineering (3)
- CE A600 Fundamentals of Environmental Engineering (3)
- CE A662 Surface Water Dynamics (3)
- CE A663 Ground Water Dynamics (3)
- CE A674 Waves, Tides and Ocean Processes for Engineers (3)
- CE A677 Coastal Measurements and Analysis (3)
- CE A683 Arctic Hydrology and Hydraulic Engineering (3)
- ENVE F651* Risk Assessment (3)
- ENVE F652* Introduction to Toxicology (3)
- ESM A450 Economic Analysis and Operations (3)
- ESM A601 Engineers and Organizations (3)
- ESM A605 Engineering Economy (3)
- PM A601 Project Management (3)

• Geology

- GEOL A455 Permafrost (3)
- GEOL A457 Soil Genesis and Classification (4)
- GEOL A460 Environmental Geochemistry (3)
- GEOL A475 Environmental Geophysics (3)
- GEOL A690 Graduate Topics in Geology (1-4)

*UAF online courses. It is the student's responsibility to check the UAF catalog for current course content and availability.

3 COMPLETE THESIS

For MS-AEST degree only.

- AEST A699 Thesis (1-6)

4 SUCCESSFULLY COMPLETE THE COMPREHENSIVE EXAM

MS-AEST is an oral comprehensive examination; M-AEST is a written comprehensive exam.

A total of 30 credits is required. The MS-AEST requires 24 course credits and 6 thesis credits; the M-AEST requires 30 course credits.

Note: Once a student has successfully advanced to candidacy for the MS-AEST degree, that student may not opt to complete their degree under the non-thesis option (M-AEST degree).

12-2007

AEST: 907.786.1951

ACADEMIC ADVISOR: 907.786.1951

WEBSITE: enr.uaa.alaska.edu/programs/environmental/

EMAIL: ayced@uaa.alaska.edu

UAA ENROLLMENT SERVICES: 907.786.1480

ADDRESS: P.O. Box 141629, Anchorage, AK 99514-1629



Career Clusters titles are being used with permission of the States' Career Clusters Initiative, 2006, www.careerclusters.org.

Project Management (MS)



CAREERS WITH OPPORTUNITIES

The Project Management (PM) program is designed for graduates who currently hold or will hold project management positions in virtually all areas of business and industry: Engineering, Construction, Oil & Gas, Mining, Communications, Healthcare, Information Technology, Utilities, Education, and Transportation in both the private and public sectors, focused primarily, but not exclusively, on technology-driven projects.

Educational Pathway Options

Associate's Degrees

2-3 Years

Students with an associate's degree may pursue a baccalaureate degree in an engineering, science, or equivalent area.

Bachelor's Degrees

4-5 Years

A baccalaureate degree in an engineering, science, or equivalent area. Degrees include (but not limited to):

- Bachelor of Engineering (BSE)
- Bachelor of Business Administration (BBA)
- Bachelor of Science (BS)
- Bachelor of Arts (BA)

Master of Science (MS)

2-3 Years

Project Management

- CAREER CONNECTIONS** • Architecture & Construction
 • Information Technology • Business, Management, & Administration
 • Science, Mathematics, Engineering, & Research
 • Transportation, Distribution, & Logistics
 • Natural Resources & Environmental Sciences

APPLICATION PROCESS

ENROLLMENT SERVICES

- 1 Apply for admission at www.uaa.alaska.edu/admissions.
- 2 Submit official transcripts reflecting:
 - Completion of an undergraduate or MS degree in engineering, science or equivalent areas (as agreed by Department Chair) from a regionally accredited institution.
 - Statistics courses
 - All graduate-level credit
- 3 Contact 907.786.1924 or visit soe.uaa.alaska.edu/espm for additional information.

PROGRAM SPECIFIC

Submit the following:

- Three letters of recommendation from professors, former or current employers, or supervisors who are familiar with the applicant's work experience.
- Statement of professional career objectives related to the study of project management.

Applicants must have a 'B' average or higher in the last two years of undergraduate work and in a statistics course, and must have at least two years of appropriate project management experience in a science or engineering related field (or as agreed by the Department Chair).

The University of Alaska Anchorage has been continuously accredited by the Northwest Commission on Colleges and Universities since 1974. This brochure is for information purposes only and does not constitute a contract. UAA is an EO/AA employer and educational institution.

PROGRAM HIGHLIGHTS

- Began in 2003
- Over 100 students located globally
- Accredited in September 2007 by the PMI® Global Accreditation Center (GAC)
- One of the first 13 programs around the globe to receive accreditation
- Designed for working-professional students
- Helps students develop a high-demand skill-set valued in private and public sectors for all fields and industries
- Project Management program built around the Project Management Body of Knowledge (PMBOK®) Guide's nine knowledge areas, five process groups, and professional responsibility
- Courses are taught by a strong team of faculty and instructors who bring extensive academic and professional experience to each course
- Diverse and accomplished student body
- Highly aligned with industry leaders
- Customized and Cohort Programs available
- In-class and global, real-time distance course delivery
- On-line, asynchronous course delivery also available
- Program designed for working-professional students
- Industry sponsored scholarships
- Project Management Institute (PMI®) Registered Education Provider (R.E.P.®)
- Professional Project Management training courses
- Strong ties to UAA graduate-level Engineering Management and Science Management programs
- MSPM graduates hold leadership positions in both public and private sector
- Student-conducted research opportunities
- Program-sponsored volunteer and community service activities

PROJECT MANAGEMENT (MS)

▶ COMPLETE THE CORE CURRICULUM (33 credits)

PM A601*	Project Management Fundamentals (3)
PM A610	Project Scope Management (3)
PM A612	Project Time Management (3)
PM A614	Project Cost Management (3)
PM A616	Project Quality Management (3)
PM A620	Project Human Resources Management (3)
PM A622	Project Communications Management (3)
PM A624	Project Risk Management (3)
PM A626	Project Procurement Management (3)
PM A685*	Project Management Case Study and Research (6)

*Required courses

A minimum of 33 credits is required for the degree.

- It is strongly recommended that students take PM A601 Project Management Fundamentals in their first semester.
- As a prerequisite for PM A685 registration, students must have a cumulative GPA of 3.0 GPA or better in courses listed on their official graduate studies plans.
- Students who have previously been awarded a master's degree in another program can complete the program with a minimum of 24 credits but must take PM A601 and PM A685.
- The Master of Science Project Management program charges a per-credit program fee equivalent to the per-credit graduate, resident tuition.

2-2008

PROJECT MANAGEMENT: 907.786.1924
DEPARTMENT CHAIR: Dr. Jang Ra, 907.786.1862
WEBSITE: soe.uaa.alaska.edu/espm
EMAIL: ayespm@uaa.alaska.edu

UAA ENROLLMENT SERVICES: 907.786.1480
ADDRESS: P.O. Box 141629, Anchorage, AK 99514-1629



Career Clusters titles are being used with permission of the States' Career Clusters Initiative, 2006, www.careerclusters.org.

Engineering Management and Science Management (MS)



CAREERS WITH OPPORTUNITIES

The Engineering Management and Science Management (ESM) programs are designed for graduate engineers and scientists who will hold executive or managerial positions in engineering, construction, industrial, or government organizations. The programs address human relations, financial, economic, quantitative, technical, and legal subjects useful in solving problems of management.

Educational Pathway Options

Associate's Degrees

2-3 Years

Students with an associate's degree may pursue a baccalaureate degree in an engineering, science, or equivalent area.

Bachelor of Science (BS)

4-5 Years

A baccalaureate degree in an engineering discipline for the Engineering Management (MS) degree.

A baccalaureate degree in any science discipline for the Science Management (MS) degree.

Master of Science (MS)

2-3 Years

**Engineering Management
Science Management**

- CAREER CONNECTIONS**
- Architecture & Construction
 - Information Technology • Business, Management, & Administration
 - Science, Mathematics, Engineering, & Research
 - Transportation, Distribution, & Logistics
 - Natural Resources & Environmental Sciences
 - Law, Government, & Public Safety

APPLICATION PROCESS

ENROLLMENT SERVICES

- 1 Apply for admission at www.uaa.alaska.edu/admissions.
- 2 Submit official transcripts reflecting:
 - Completion of an undergraduate or MS degree in engineering (for Engineering Management) or any science discipline (for Science Management) from a regionally accredited institution.
 - Statistics courses
 - All graduate-level credit
- 3 Contact 907.786.1924 or visit soe.uaa.alaska.edu/espm for additional information.

PROGRAM SPECIFIC

Applicants must have on-the-job experience in engineering or science.

No more than nine semester credits of appropriate graduate-level coursework completed at other institutions with a grade of 'B' or higher may be transferred. Both substitutions and transfer credits must be approved by the department.

The University of Alaska Anchorage has been continuously accredited by the Northwest Commission on Colleges and Universities since 1974. This brochure is for information purposes only and does not constitute a contract. UAA is an EO/AA employer and educational institution.

PROGRAM HIGHLIGHTS

- Began in 1961
- Oldest graduate program at UAA
- Over 500 graduates
- Courses are taught by a strong team of faculty and instructors who bring extensive academic and professional experience to each course
- Strong ties to Project Management program
- Diverse and accomplished student body
- ESM graduates hold leadership positions in the public and private sectors
- Student-conducted research opportunities
- Program-sponsored volunteer and community service activities

ENGINEERING MANAGEMENT AND SCIENCE MANAGEMENT (MS)

▶ COMPLETE THE CORE CURRICULUM (21 credits)

ESM A601	Engineers in Organizations (3)
ESM A605	Engineering Economy (3)
ESM A608	Legal Environment for Engineering Management (3)
ESM A610	Cost Estimating (3)
ESM A620	Statistics for ESM or equivalent (3)
ESM A621	Operations Research (3)
PM A601*	Project Management Fundamentals (3)

*PM fee applies

▶ COMPLETE THE ELECTIVE CURRICULUM (6 credits)

Any ESM, PM, Engineering, Science, Business Administration or other courses approved by ESM advisor.

ESM A606	Advanced Engineering Economy (3)
ESM A613	Management of Technical People (3)
ESM A617	Technology Management (3)
ESM A619	Computer Simulation of Systems (3)
ESM A623	Total Quality Management (3)
ESM A625	Marketing of Business Products and Services (3)
ESM A694G	Management System Dynamics (3)
ESM A694H	Value Engineering (3)
ESM A698	Individual Research (3)

▶ COMPLETE A THESIS OPTION

Both options require a defense.

- **Non-Thesis**
Complete ESM A684 (ESM Project)
- **Thesis**
Complete 6 to 9 credits of ESM A699 (ESM Thesis)

A minimum of 30 credits is required for the degree.

- As a prerequisite for ESM A684 or ESM A699, students must have a cumulative 3.0 GPA or better in courses listed on their official graduate studies plan.
- Project Management courses charge an additional per-credit program fee equivalent to the per-credit graduate, resident tuition.

2-2008

ENGINEERING & SCIENCE MANAGEMENT: 907.786.1924
DEPARTMENT CHAIR: Dr. Jang Ra, 907.786.1862
WEBSITE: soer.uaa.alaska.edu/espm
EMAIL: ayespm@uaa.alaska.edu

UAA ENROLLMENT SERVICES: 907.786.1480
ADDRESS: P.O. Box 141629, Anchorage, AK 99514-1629



Career Clusters titles are being used with permission of the States Career Clusters Initiative, 2006. www.careerclusters.org

Engineering (BSE)

Computer Systems • Electrical • Mechanical



CAREERS WITH OPPORTUNITIES

The Engineering BSE program is a design-oriented curriculum incorporating topics which span the foundations of engineering disciplines and prepare students to meet community and industry needs. Students select from one of three specialization tracks: Computer Systems Engineering, Electrical Engineering, or Mechanical Engineering.

Educational Pathway Options

Recommended Preparation	Bachelor of Science In Engineering (BSE)	Graduate Certificate	Master Degrees
<p>High School</p> <ul style="list-style-type: none"> Algebra: 2 years Trigonometry: ½ year Chemistry: 1 year Physics: 1 year English: 3 years 	<p>4-5 Years</p> <p>Engineering</p> <p>Specialization Tracks:</p> <ul style="list-style-type: none"> Electrical Engineering Mechanical Engineering Computer Systems Engineering <p>Upon completion of BSE degree, students automatically qualify for a Minor in Mathematics.</p>	<p>1-2 Years</p> <p>Port & Coastal Engineering</p> <p>Upon completion of this certificate, nine credits can be applied toward other graduate degrees at UAA.</p>	<p>1-3 Years</p> <ul style="list-style-type: none"> Applied Environmental Science & Technology Arctic Engineering Civil Engineering Engineering Management Project Management Science Management

APPLICATION PROCESS

ENROLLMENT SERVICES

- 1 Apply for admission at www.uaa.alaska.edu/admissions.
- 2 Review admission requirements for your student type.
- 3 Submit required documents to UAA Enrollment Services.
- 4 Take the SAT, ACT, or Accuplacer test for English and math course placement. Call the UAA Advising & Testing Center at 907.786.4500 for testing information.
- 5 Make an appointment for academic advising at 907.786.1900 and meet regularly with an advisor.
- 6 Access the Future Student Checklist online at <http://www.uaa.alaska.edu/prospective/checklist.cfm> to stay on track.

The University of Alaska Anchorage has been continuously accredited by the Northwest Commission on Colleges and Universities since 1974. This brochure is for information purposes only and does not constitute a contract. UAA is an EO/AA employer and educational institution.

PROGRAM SPECIFIC

To be approved for the Engineering "major" status, students need to complete the high school preparatory courses with a grade of "C" or better. If one or more of the preparatory courses are not satisfied, the student may be accepted in a "pre-major" status and is advanced to "major" status upon completion of preparatory requirements with departmental approval. Students with either "pre-major" or "major" status are considered enrolled in the BSE program. All students are advised to work with an assigned advisor to develop a course plan.

ENGINEERING (BSE)

Students are strongly recommended to seek an appointment with a faculty advisor in the School of Engineering, BSE program, at 907.786.1900 prior to course selection.

▶ COMPLETE GENERAL EDUCATION REQUIREMENTS (15 credits)

Fine Arts (3), Humanities (6), Social Sciences (6)
See the BSE website for more information

▶ COMPLETE ADVANCED MATH ELECTIVE (3 credits)

Select one course from the following list:

MATH A310	Numerical Methods (3)
MATH A314	Linear Algebra (3)
MATH A321	Analysis of Several Variables (3)
MATH A324	Advanced Calculus (3)
MATH A371	Stochastic Processes (3)
MATH A407	Mathematical Statistics I (3)
MATH A410	Introduction to Complex Analysis (3)
MATH A422	Partial Differential Equations (3)

▶ COMPLETE ADVANCED ENGINEERING ELECTIVES (12 credits)

See the BSE website for a list of electives.

▶ COMPLETE MAJOR REQUIREMENTS (61 credits)

CHEM A105	General Chemistry I (3)
CHEM A105L	General Chemistry I Lab (1)
COMM A111	Fundamentals of Oral Communications (3)
ENGL A111	Methods of Written Communication (3)
ENGL A212	Technical Writing (3)
ENGR A151	Engineering Practices I (3)
ENGR A161	Engineering Practices II (3)
ENGR A192	Engineering Seminar I (1)
ENGR A251	Engineering Practices III (3)
ENGR A292	Engineering Seminar II (1)
ENGR A392	Engineering Seminar III (1)
ENGR A438	Engineering Systems Design (3)
ES A208	Engineering Mechanics (4)
ES A302	Probability & Statistics (3)
ESM A450	Economic Analysis & Operations (3)
MATH A200	Calculus I (4)
MATH A201	Calculus II (4)
MATH A202	Calculus III (4)
MATH A302	Ordinary Differential Equations (3)
PHYS A211	General Physics I (3)
PHYS A211L	General Physics I Lab (1)
PHYS A212	General Physics II (3)
PHYS A212L	General Physics II Lab (1)

▶ COMPLETE A SPECIALIZATION TRACK

COMPUTER SYSTEMS ENGINEERING (41 credits)

CS A201	Programming Concepts I (3)
CS A202	Programming Concepts II (3)
CS A221	Computer Org. & Assembly Program (3)
CS A320	Operating Systems (3)
CS A330	Algorithms and Data Structures (3)
CSE A445	Computer Design & Interfacing (4)
EE A203	Fundamentals of Electrical Engr I (4)
EE A204	Fundamentals of Electrical Engr II (4)
EE A241	Computer Hardware Concepts (4)
EE A314	Electromagnetics (3)
EE A314L	Electromagnetics Laboratory I (1)
EE A351	Signals & Systems (3)
EE A465	Telecommunications (3)

Total Credits for Degree = 132

ELECTRICAL ENGINEERING (41 credits)

CS A201	Programming Concepts I (3)
CS A202	Programming Concepts II (3)
CS A221	Computer Org. & Assembly Program (3)
EE A203	Fundamentals of Electrical Engr I (4)
EE A204	Fundamentals of Electrical Engr II (4)
EE A241	Computer Hardware Concepts (4)
EE A314	Electromagnetics (3)
EE A314L	Electromagnetics Lab I (1)
EE A324	Electromagnetics II (3)
EE A324L	Electromagnetics Lab II (1)
EE A351	Signals & Systems (3)
EE A353	Circuit Theory (3)
EE A441	Integrated Circuit Design (3)
EE A465	Telecommunications (3)

Total Credits for Degree = 132

MECHANICAL ENGINEERING (39 credits)

CHEM A106	General Chemistry II (3)
CHEM A106L	General Chemistry II Lab (1)
ES A309	Elements of Electrical Engineering (3)
ES A331	Mechanics of Materials (3)
ES A341	Fluid Mechanics (4)
ES A346	Basic Thermodynamics (3)
ME A302	Mechanical Design I (4)
ME A308	Instrumentation and Measurements (3)
ME A313	Mechanical Engineering Thermodynamics (3)
ME A334	Elements of Material Science (3)
ME A403	Mechanical Design II (3)
ME A414	Thermal System Design (3)
ME A441	Heat & Mass Transfer (3)

Total Credits for Degree = 130

The programs within the University Honors College may satisfy some of the degree requirements while providing challenging opportunities to excel. To find out more, go to www.uaa.alaska.edu/honors or call 907.786.1086.

12-2007

SCHOOL OF ENGINEERING:

www.engr.uaa.alaska.edu/index.cfm

BSE PROGRAM ADVISOR: 907.786.1900

BSE WEBSITE: www.engr.uaa.alaska.edu/programs/bse

FAX: 907.786.1079

UAA ENROLLMENT SERVICES: 907.786.1480

ADDRESS: P.O. Box 141629, Anchorage, AK 99514-1629



Career Clusters titles are being used with permission of the States' Career Clusters Initiative, 2006. www.careerclusters.org

Economics (BBA, BA)



TURNING OPPORTUNITY INTO SUCCESS

The Economics Department provides students with a systematic way of understanding activity in the world around them. Economics is often called the "science of choice," as it studies how individuals, organizations, and governments make choices about the use of resources. A degree in economics gives students career opportunities in many fields and provides excellent preparation for advanced study in a variety of disciplines.

Educational Pathway Options

Recommended Preparation	Bachelor's Degrees	Graduate Certificates
<p>High School</p> <ul style="list-style-type: none"> • Reading and Writing Skills • Basic Computer Skills • Mathematics • Statistics • Economics • History 	<p>4-5 Years</p> <p>Economics</p> <ul style="list-style-type: none"> • Bachelor of Business Administration (BBA) • Bachelor of Arts (BA) 	<p>1-3 Years</p> <ul style="list-style-type: none"> • General Management (MBA) • Public Administration (MPA) • Global Supply Chain Management (MS) • Supply Chain Management (GRAD CERT)

APPLICATION PROCESS

ENROLLMENT SERVICES

- 1 Apply for admission at www.uaa.alaska.edu/admissions
- 2 Review admission requirements for your student type
- 3 Submit required documents to UAA Enrollment Services
- 4 Take the SAT, ACT, or Accuplacer test for English and math course placement. Call the UAA Advising & Testing Center at 907.786.4500 for testing information.
- 5 Make an appointment for academic advising at 907.786.4100 and meet regularly with an advisor.
- 6 Access the Future Student Checklist online at <http://www.uaa.alaska.edu/prospective/checklist.cfm> to stay on track.

*The University of Alaska Anchorage has been continuously accredited by the Northwest Commission on Colleges and Universities since 1974.
This brochure is for information purposes only and does not constitute a contract. UAA is an EO/AA employer and educational institution.*

ECONOMICS (BA)

YEAR 1	Credits	Semester	Grade
Written Communication GER	3		
COMM 111, 235, 237, or 241	3		
Humanities GER	3		
Natural Science GER	3		
MATH 172 or 107	3/4		
Written Communication GER	3		
Humanities GER	3		
Natural Science GER with Lab	4		
CIS.110 (Computer Concepts in Business)	3		
Elective	3		
YEAR 2			
ECON 201 (Macroeconomics)	3		
MATH 272 or 200	3/4		
Social Science GER	3		
Elective	3		
Elective	3		
ECON 202 (Microeconomics)	3		
BA 273 (Intro to Statistics for Business)	3		
Fine Arts GER	3		
Social Science GER	3		
Elective	3		
YEAR 3			
ECON 321 (Intermediate Microeconomics)	3		
ECON 350 (Money and Banking)	3		
Upper-Division Elective	3		
Upper-Division Elective	3		
Elective	3		
ECON 324 (Intermediate Macroeconomics)	3		
Upper-Division ECON Elective	3		
Upper-Division Elective	3		
Upper-Division Elective	3		
Elective	3		
YEAR 4			
ECON 412 (Econometrics)	3		
Upper-Division ECON Electives	6		
Capstone GER	3		
Upper-Division Elective	3		
Upper-Division ECON Elective	3		
Upper-Division Electives	6		
Elective	3.5		

ECONOMICS (BBA)

YEAR 1	Credits	Semester	Grade
Written Communication GER	3		
COMM 111, 235, 237, or 241	3		
Humanities GER	3		
Natural Science GER	3		
Social Science GER	3		
CIS 110 (Computer Concepts in Business)	3		
ENGL 212 (Technical Writing)	3		
MATH 172 or 107	3/4		
Humanities GER	3		
Natural Science GER with Lab	4		
YEAR 2			
ACCT 201 (Financial Accounting)	3		
BA 241 (Business Law I)	3		
ECON 201 (Macroeconomics)	3		
MATH 272 or 200	3/4		
Social Science GER	3		
ACCT 202 (Managerial Accounting)	3		
BA 273 (Intro to Statistics for Business)	3		
ECON 202 (Microeconomics)	3		
Fine Arts GER	3		
Elective	3		
YEAR 3			
BA 300 (Organizational Behavior)	3		
BA 325 (Corporate Finance)	3		
CIS 305 (Managerial Presentations)	3		
ECON 321 (Intermediate Microeconomics)	3		
ECON 350 (Money and Banking)	3		
BA 377 (Operations Management)	3		
BA 343 (Principles of Marketing)	3		
CIS 376 (Management Information Systems)	3		
ECON 324 (Intermediate Macroeconomics)	3		
Elective	3		
YEAR 4			
ECON 429 (Business Forecasting)	3		
Upper-Division ECON Electives	6		
Capstone GER	3		
BA 488 (Environment of Business)	3		
Upper-Division ECON Electives	6		
Elective	3		
Electives	3.5		

A total of 120 credits is required for each degree, of which 48 credits must be upper-division.

This is a suggested course sequence and students should refer to the UAA Course Catalog for current information.

SCHOLARSHIP OPPORTUNITIES

UAA College of Business & Public Policy Scholarship
 UAA Jan & Glenn Fredericks Scholarship (Junior or Senior standing)
 UAA Bradford Tuck Scholarship (Junior and Senior Economic Majors)
 UAA Diane Olsen Memorial Scholarship (Junior and Senior Economic Majors)
www.uaa.alaska.edu/scholarships

COLLEGE OF BUSINESS & PUBLIC POLICY



Earned Excellence
 The Best Business Schools in the World

The College of Business & Public Policy is accredited by the Association to Advance Collegiate Schools of Business, International.

The programs within the University Honors College may satisfy some of the degree requirements while providing challenging opportunities to excel. To find out more, go to www.uaa.alaska.edu/honors or call 907.786.1086.

11-2007

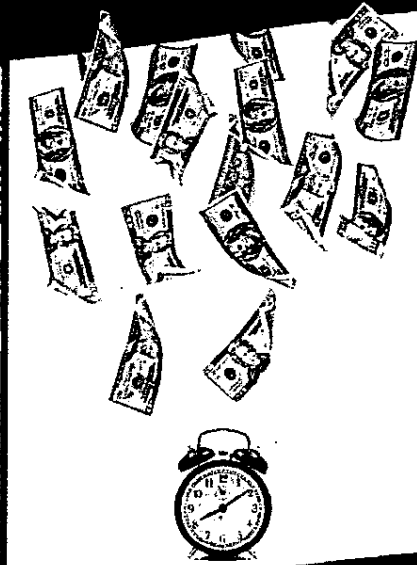
COLLEGE OF BUSINESS & PUBLIC POLICY:
www.cbpp.uaa.alaska.edu
 STUDENT INFORMATION: 907.786.4100
 FAX: 907.786.4119

UAA ENROLLMENT SERVICES: 907.786.1480
 ADDRESS: P.O. Box 141629, Anchorage, AK 99514-1629



Career Clusters titles are being used with permission of the States Career Clusters Initiative, 2006, www.careerclusters.org.

Finance (BBA)



TURNING OPPORTUNITY INTO SUCCESS

The Bachelor of Business Administration in Finance is a professional degree designed to prepare students to pursue meaningful and rewarding careers in financial management of corporations or non-profit organizations; investment banking and money management; retirement planning and management of pension funds; banking and insurance industry; real estate development, sales and property management.

Educational Pathway Options

Recommended Preparation	Bachelor of Business Administration (BBA)	Graduate Degrees
<p>High School</p> <ul style="list-style-type: none"> • Reading and Writing Skills • Basic Computer Skills • Mathematics 	<p>4-5 Years</p> <p>Finance</p> <p>Concentration Areas:</p> <ul style="list-style-type: none"> • Real Estate and Property Management • Investment 	<p>1-3 Years</p> <ul style="list-style-type: none"> • General Management (MBA) • Public Administration (MPA) • Global Supply Chain Management (MS) • Supply Chain Management (GRAD CERT)

APPLICATION PROCESS

ENROLLMENT SERVICES

- 1 Apply for admission at www.uaa.alaska.edu/admissions.
- 2 Review admission requirements for your student type.
- 3 Submit required documents to UAA Enrollment Services.
- 4 Take the SAT, ACT, or Accuplacer test for English and math course placement. Call the UAA Advising & Testing Center at 907.786.4500 for testing information.
- 5 Make an appointment for academic advising at 907.786.4100 and meet regularly with an advisor.
- 6 Access the Future Student Checklist online at <http://www.uaa.alaska.edu/prospective/checklist.cfm> to stay on track.

The University of Alaska Anchorage has been continuously accredited by the Northwest Commission on Colleges and Universities since 1974. This brochure is for information purposes only and does not constitute a contract. UAA is an EO/AAE employer and educational institution.

REAL ESTATE & PROPERTY MGMT (BBA)

YEAR 1	Credits	Semester	Grade
Written Communication GER	3		
COMM 111, 235, 237, or 241	3		
Humanities GER	3		
Natural Science GER	3		
Social Science GER	3		
CIS 110 (Computer Concepts of Business)	3		
ENGL 212 (Technical Writing)	3		
MATH 172 or 107	3/4		
BA 131 (Personal Finance)	3		
Natural Science GER with Lab	4		
YEAR 2			
ACCT 201 (Financial Accounting)	3		
BA 241 (Business Law I)	3		
ECON 201 (Macroeconomics)	3		
MATH 272 or 200	3/4		
Humanities GER	3		
ACCT 202 (Managerial Accounting)	3		
BA 273 (Intro to Statistics for Business)	3		
ECON 202 (Microeconomics)	3		
BA 242 (Business Law II)	3		
Fine Arts GER	3		
YEAR 3			
BA 300 (Organizational Behavior)	3		
BA 325 (Corporate Finance)	3		
BA 343 (Principles of Marketing)	3		
CIS 305 (Managerial Presentations)	3		
Elective	3		
BA 377 (Operations Management)	3		
CIS 376 (Management Information Systems)	3		
BA 306 (Real Estate Principles)	3		
Upper-Division Real Estate Elective	3		
Elective	3		
YEAR 4			
BA 320 (Real Estate Finance)	3		
BA 488 (Environment of Business)	3		
Upper-Division Real Estate Electives	6		
Upper-Division Business or Real Estate Elective	3		
Upper-Division Business Elective	3		
Upper-Division Business or Real Estate Electives	6		
Elective	3		

A total of 120 credits is required for each degree, of which 48 credits must be upper-division.

This is a suggested course sequence and students should refer to the UAA Course Catalog for current information.

SCHOLARSHIP OPPORTUNITIES

UAA College of Business & Public Policy Scholarship
 UAA Jan & Glenn Fredericks Scholarship (Junior or Senior standing)
 UAA Michael D. Ford Scholarship (Business Majors)
 UAA Eduardo Gustavo Prieto Scholarship (Logistics and Business Majors)
<http://www.uaa.alaska.edu/financialaid/scholarship.cfm>

The programs within the University Honors College may satisfy some of the degree requirements while providing challenging opportunities to excel. To find out more, go to www.uaa.alaska.edu/honors or call 907.786.1086.

INVESTMENT (BBA)

YEAR 1	Credits	Semester	Grade
Written Communication GER	3		
COMM 111, 235, 237, or 241	3		
Humanities GER	3		
Natural Science GER	3		
Social Science GER	3		
CIS 110 (Computer Concepts of Business)	3		
English 212 (Technical Writing)	3		
MATH 172 or 107	3/4		
Humanities GER	3		
Natural Science with Lab	4		
YEAR 2			
ACCT 201 (Financial Accounting)	3		
BA 241 (Business Law I)	3		
ECON 201 (Macroeconomics)	3		
MATH 272 or 200	3/4		
Elective	3		
ACCT 202 (Managerial Accounting)	3		
BA 273 (Intro to Statistics for Business)	3		
ECON 202 (Microeconomics)	3		
BA 242 (Business Law II)	3		
Fine Arts GER	3		
YEAR 3			
BA 300 (Organizational Behavior)	3		
BA 325 (Corporate Finance)	3		
BA 343 (Principles of Marketing)	3		
CIS 305 (Managerial Presentations)	3		
Elective	3		
BA 377 (Operations Management)	3		
CIS 376 (Management Information Systems)	3		
ECON 429 or BA 375	3		
BA 385 (Advanced Corporate Finance)	3		
Elective	3		
YEAR 4			
BA 380 (Investment Management)	3		
BA 488 (Environment of Business)	3		
Upper-Division Finance Electives	6		
Upper-Division Business or Finance Elective	3		
Upper-Division Finance Electives	6		
Upper-Division Business or Finance Electives	6		
Elective	3		

COLLEGE OF BUSINESS & PUBLIC POLICY



Earned Excellence
 The Best Business Schools in the World

The College of Business & Public Policy is accredited by the Association to Advance Collegiate Schools of Business, International.

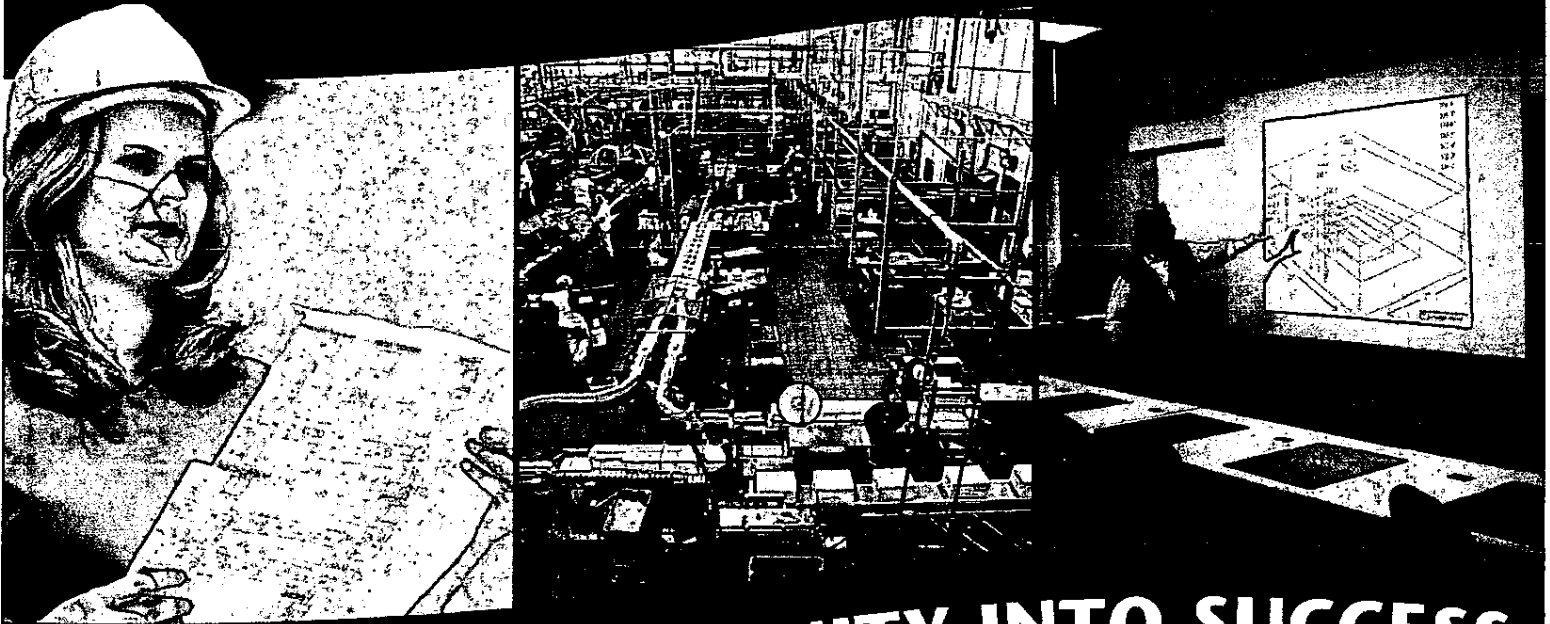
COLLEGE OF BUSINESS & PUBLIC POLICY:
www.cbpp.uaa.alaska.edu
 STUDENT INFORMATION: 907.786.4100
 FAX: 907.786.4119

UAA ENROLLMENT SERVICES: 907.786.1480
 ADDRESS: P.O. Box 141629, Anchorage, AK 99514-1629



Career Clusters titles are being used with permission of the States' Career Clusters Initiative, 2006. www.careerclusters.org

Global Logistics Management (BBA)



TURNING OPPORTUNITY INTO SUCCESS

Logistics refers to the movement of material into and within a business firm and the distribution of final products to customers. The Bachelor of Business Administration in Global Logistics Management is a professional degree designed to prepare students to pursue meaningful and rewarding careers in management. Prospective employers include business firms, nonprofit organizations, and government agencies.

Educational Pathway Options

Recommended Preparation	Associate of Applied Science (AAS)	Bachelor of Business Administration (BBA)	Graduate Degrees
High School <ul style="list-style-type: none"> • Reading and Writing Skills • Basic Computer Skills • Mathematics: 3 to 4 years of college preparatory math 	2-3 Years Logistics Operations Certificate 1-2 Years Logistics	4-5 Years Global Logistics Management	1-4 Years <ul style="list-style-type: none"> • Global Supply Chain Management (MS) • Supply Chain Management (GRAD CERT) • General Management (MBA) • Public Administration (MPA)

CAREER CONNECTIONS

- Transportation, Distribution, & Logistics
- Business, Management, & Administration
- Architecture & Construction

APPLICATION PROCESS

ENROLLMENT SERVICES

- 1 Apply for admission at www.uaa.alaska.edu/admissions
- 2 Review admission requirements for your student type
- 3 Submit required documents to UAA Enrollment Services
- 4 Take the SAT, ACT, or Accuplacer test for English and math course placement. Call the UAA Advising & Testing Center at 907-786-4500 for testing information.
- 5 Make an appointment for academic advising at 907-786-4100 and meet regularly with an advisor.
- 6 Access the Future Student Checklist online at <http://www.uaa.alaska.edu/prospective/checklist.cfm> to stay on track.

The University of Alaska Anchorage has been continuously accredited by the Northwest Commission on Colleges and Universities since 1974.
This brochure is for information purposes only and does not constitute a contract. UAA is an EO/AA employer and educational institution.

GLOBAL LOGISTICS MANAGEMENT (BBA)

▶ YEAR 1	Credits	Semester	Grade	▶ YEAR 3	Credits	Semester	Grade
Written Communication GER	3	_____	_____	BA 300 (Organizational Behavior)	3	_____	_____
COMM 111, 235, 237, or 241	3	_____	_____	BA 325 (Corporate Finance)	3	_____	_____
Humanities GER	3	_____	_____	BA 377 (Operations Management)	3	_____	_____
Natural Science GER	3	_____	_____	LOG 378 (Global Logistics Supply Chain)	3	_____	_____
Elective ¹	3	_____	_____	CIS 305 (Managerial Presentations)	3	_____	_____
CIS 110 (Computer Concepts in Business)	3	_____	_____	LOG 379 (Transportation Management)	3	_____	_____
ENGL 212 (Technical Writing)	3	_____	_____	CIS 376 (Management Information Systems)	3	_____	_____
MATH 172 or 107	3/4	_____	_____	BA 343 (Principles of Marketing)	3	_____	_____
Humanities GER	3	_____	_____	Elective ¹	3	_____	_____
Natural Science GER with Lab	4	_____	_____	Elective ¹	3	_____	_____
▶ YEAR 2				▶ YEAR 4			
ACCT 201 (Financial Accounting)	3	_____	_____	LOG 415 (Purchasing Management)	3	_____	_____
BA 241 (Business Law I)	3	_____	_____	LOG 495 (Internship) ³	3	_____	_____
ECON 201 (Macroeconomics) ²	3	_____	_____	Upper Division Logistics Elective	3	_____	_____
MATH 272 or 200	3/4	_____	_____	Upper-Division Logistics Elective	3	_____	_____
Social Science GER	3	_____	_____	Elective ¹	3	_____	_____
ACCT 202 (Managerial Accounting)	3	_____	_____	BA 488 (Environment of Business)	3	_____	_____
BA 273 (Intro to Statistics for Business)	3	_____	_____	LOG 416 (International Logistics)	3	_____	_____
ECON 202 (Microeconomics) ²	3	_____	_____	LOG 417 (Material Management)	3	_____	_____
Fine Arts GER	3	_____	_____	Upper-Division Logistics Elective	3	_____	_____
Elective ¹	3	_____	_____	Elective ¹	0-2	_____	_____

A total of 120 credits is required for this degree, 48 of which must be upper-division.

This is a suggested course sequence and students should refer to the UAA Course Catalog for current information.

¹ Upper or lower-division courses.

² ECON 201 or ECON 202 (not both) may be used to satisfy 3 credits of a Social Science GER.

³ The internship is intended to be in logistics. This requirement may be waived if the advisor determines that the student already has significant logistics work experience. Students are urged to discuss the internship requirement with their advisor early in the semester, before registering for the course.

SCHOLARSHIP OPPORTUNITIES

UAA College of Business & Public Policy Scholarship
UAA Michael D. Ford Scholarship (*Business Majors*)
UAA Eduardo Gustavo Prieto Scholarship (*Logistics or Business Majors*)
UAA National Defense Transportation Scholarship (*Logistics Majors*)
UAA Greg Wolf Scholarship (*Logistics Majors*)
www.uaa.alaska.edu/scholarships

COLLEGE OF BUSINESS & PUBLIC POLICY



Earned Excellence
The Best Business Schools in the World

The College of Business & Public Policy is accredited by the Association to Advance Collegiate Schools of Business, International.

The programs within the University Honors College may satisfy some of the degree requirements while providing challenging opportunities to excel. To find out more, go to www.uaa.alaska.edu/honors or call 907.786.1086.

11-2007

COLLEGE OF BUSINESS & PUBLIC POLICY:
www.cbpp.uaa.alaska.edu
STUDENT INFORMATION: 907.786.4100
FAX: 907.786.4119

UAA ENROLLMENT SERVICES: 907.786.1480
ADDRESS: P.O. Box 141629, Anchorage, AK 99514-1629



Career Clusters titles are being used with permission of the States' Career Clusters Initiative, 2006. www.careerclusters.org

The UAS MBA

The Master of Business Administration (MBA) is a graduate professional degree designed to provide training in a broad set of managerial skills. Usually, it is for managers who are taking on responsibilities beyond the narrow focus of a specific business function. For example, it is not about learning lots of accounting detail, or marketing detail, etc. MBA programs do look at state-of-the-art thinking in the various business functions in some depth, but not to make people specialists in a particular business function.

Rather, most MBA programs aim to give participants an understanding of how accounting, marketing, and the whole set of business functions must fit together into a coherent whole for the organization to function well. Higher level managers need to know something of all the functions to manage the organization well.

Typically, MBA programs offer a mix of theory and practice. In other words, participants are brought up-to-date on current management concepts, and the programs make sure that participants know how to translate those concepts into the real world to perform better in their own jobs and their own organizations.

UAS MBA in Service Management: The UAS School of Business, Public Administration, & Information Systems is small, but has high quality faculty. Frequently the best small organizations in markets full of competitors aim to supply high quality, specialized products / services, and stay away from direct competition in mass produced, generic offerings. The UAS MBA focuses on Service Management to give participants a thorough understanding of services and how to manage them.

"The MBA Program was challenging and rewarding. It enhanced my management skills which I have since applied in Alaska State government."

--Guy Bell
Assistant Commissioner
Dept. of Labor & Workforce Development
UAS MBA Graduate

The focus of the UAS MBA program is tailored to Alaska's economic trends. Projections by the Alaska Department of Labor & Workforce Development indicate that the vast majority of jobs created over the next decade will be in various services areas: (<http://labor.state.ak.us/trends/sep04.pdf>). The need for skilled managers in rapidly growing services industries is becoming critical to keep Alaska's economy competitive. A few examples of service industries in Alaska which need well-trained managers include:

- health care services
- retailing & wholesaling
- tourism & hospitality
- financial services

- logistics services
- oil field and mining support services
- professional services (doctors, lawyers, architects, accountants, etc.)

Managers from almost any service industry will find the UAS MBA in Service Management filled with current thinking about how to manage the broad range of activities necessary to provide high quality service to customers / users. This knowledge is integrated into a strongly applications oriented approach. Our goal is that every participant will be able to take something from each course directly into their jobs, to immediately begin contributing toward better performance for their organizations.

Master's Degree (M.B.A.)

Business Administration in Service Management

The master program in business administration is practice-oriented, relevant to Alaskan industries, and leads to a general master of business administration degree. The program features an initial three-day residential seminar in Juneau to set the agenda, ten 3-credit, graduate-level (600) business courses offered sequentially in a seven-week web-delivered format, and two additional elective courses selected in consultation with an advisor. It is delivered to an annual cohort consisting of 25 students maximum. The program is two years in length. Student commitment to participate for the full two years is a condition of admission.

For updated information on application deadlines, continue to consult the [MBA Website](#).

PREREQUISITES

Students entering the MBA program are expected to have introductory level knowledge of management, marketing, accounting, statistics, and micro- and macroeconomics. Students whose transcripts are deficient in any of these subjects must prove competency citing relevant business experience.

APPLICATION REQUIREMENTS

1. Online application available at [UAOnline](#) including \$60 application fee
2. Official academic transcript sent directly to UAS from the college or university which awarded the baccalaureate degree
3. Professional resume or vita
4. A 1,200 word statement of professional objectives describing past vocational experiences, outlining profession goals and stating how the UAS MBA program might help you achieve your professional objectives. Please not how your background and experience will contribute to the quality of the discussion among program participants. In talking about your academic background, please include where and when you completed the prerequisite courses required in the UAS MBA classes
5. Three letters of reference must be sent directly from the referee. These three references should preferably include someone familiar with your prior academic work and someone familiar with your managerial experience
6. Items 1-5 are required for a complete application file. If you wish, you may also submit any other documentation which you feel is relevant and important for our admission decision

DEGREE REQUIREMENTS (2008-2009 catalog)

Candidates for the Master of Business Administration degree must satisfy all University graduate degree requirements in the [UAS catalog](#) as well as the specific program requirements in this section. Students must earn a B in all core courses (3.00)

Minimum Credit Hours	36
Major Requirements	36
BA S610 Management Information Systems	3

Senate Special Committee on World Trade, Technology & Innovation

Training for Emerging Alternative Energy Technology Jobs

Click Bishop, Commissioner DOLWD

Fred Esposito, Director AVTEC

February 18, 2009



Alaska Vocational Technical Center



Great Careers for
Alaska's Future

Mission Statement

*To train a diverse and effective
workforce that supports the
economic growth and stability
of our state.*

www.avtec.edu



Who We Are

- A component of the Alaska Department of Labor and Workforce Development
- Providing occupational training since 1969. Nearly Forty Years! In Seward, Anchorage, and through Distance Delivery
- Enroll approximately 1,200 students per year in job preparatory and job upgrade training programs

Diesel Power Plant Operator

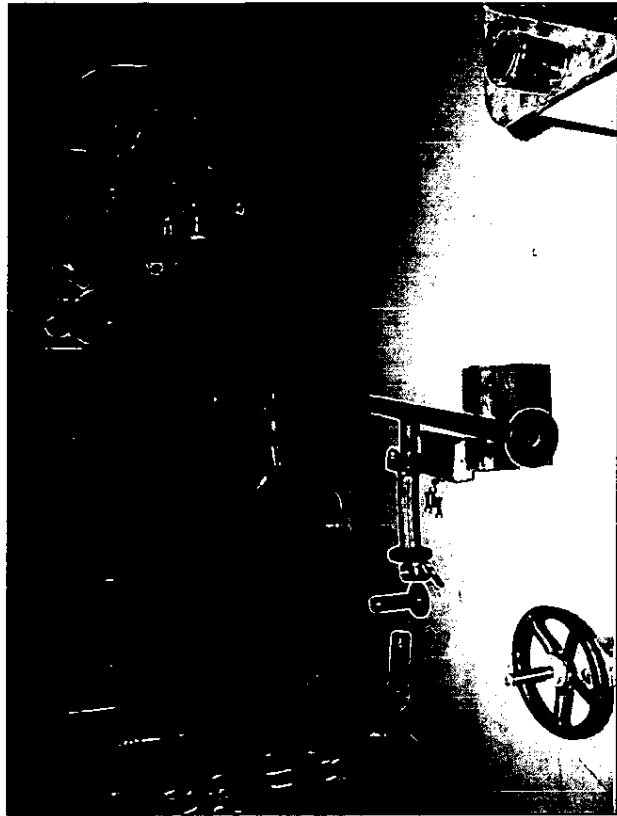
- 8 week training program
- Partnership with Alaska Energy Authority



www.avtec.edu



Bulk Fuel Plant Operator



AVTEC students engaged in the classroom and in the field managing high efficiency bulk fuel systems

www.avtec.edu/



Hydro Electric Plant Operator



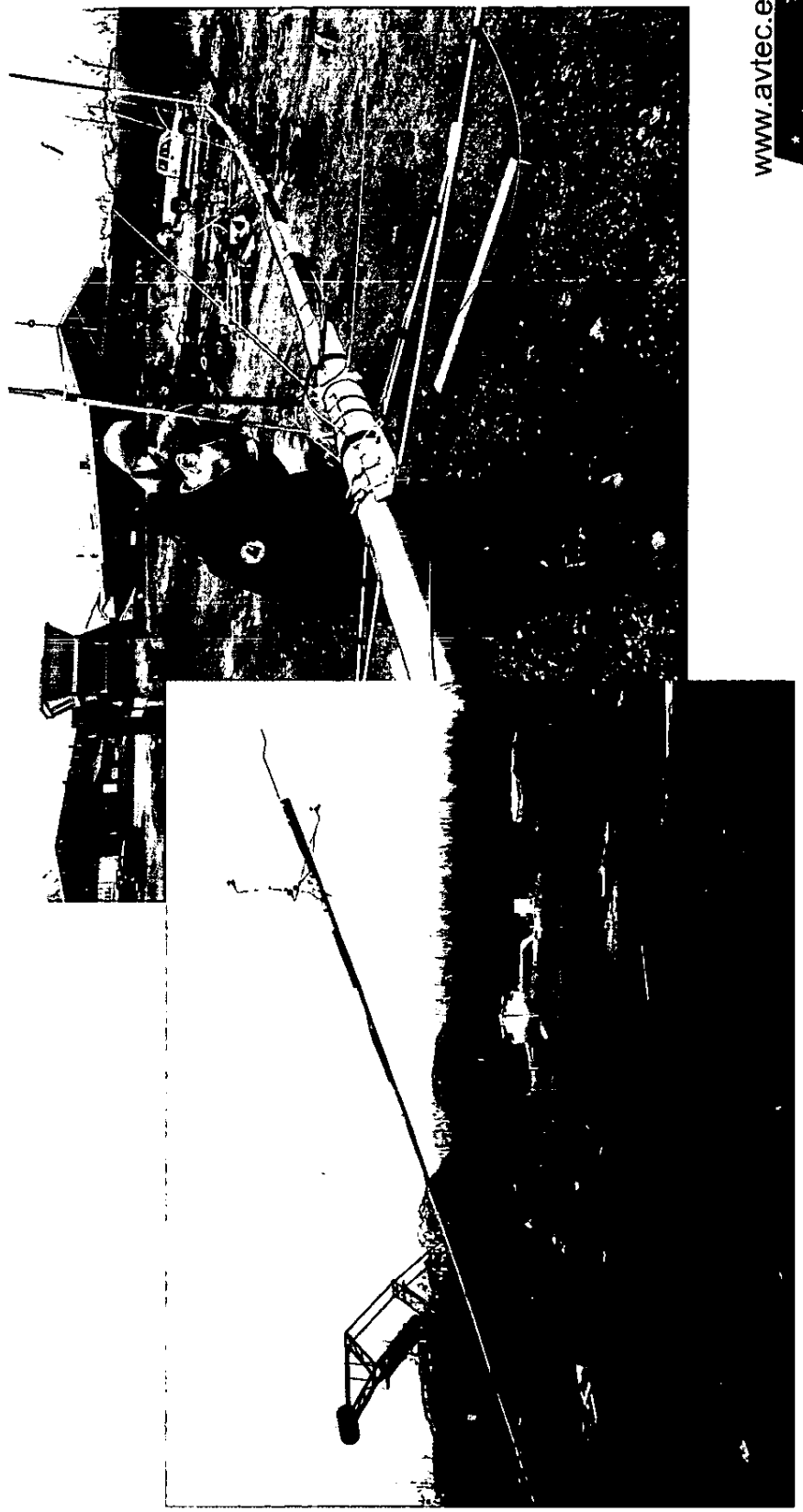
*AVTEC Students participating with operator training at the City of Seward
Hydro Plant*

www.avtec.edu



Met Tower Installation

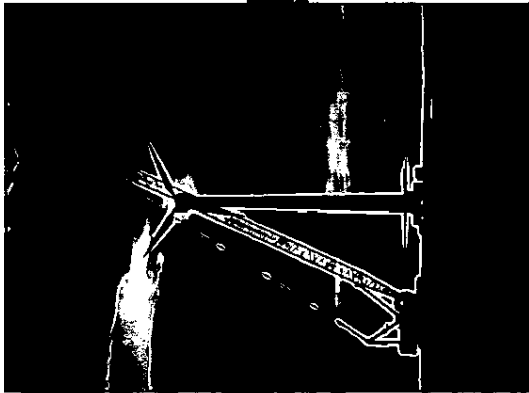
Studying Wind Energy at AVTEC's Seward Campus



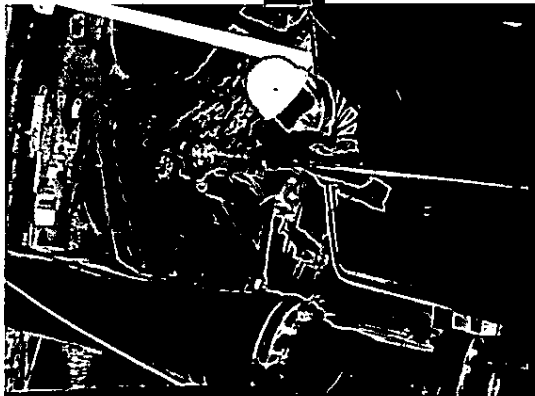
www.avtec.edu



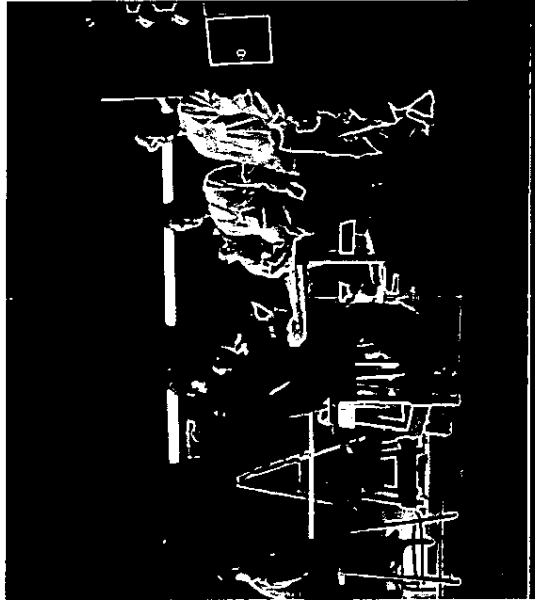
Wind-Diesel Training Overview



INSTALLATION



ON-GOING
"HANDS-ON" O/M
TRAINING



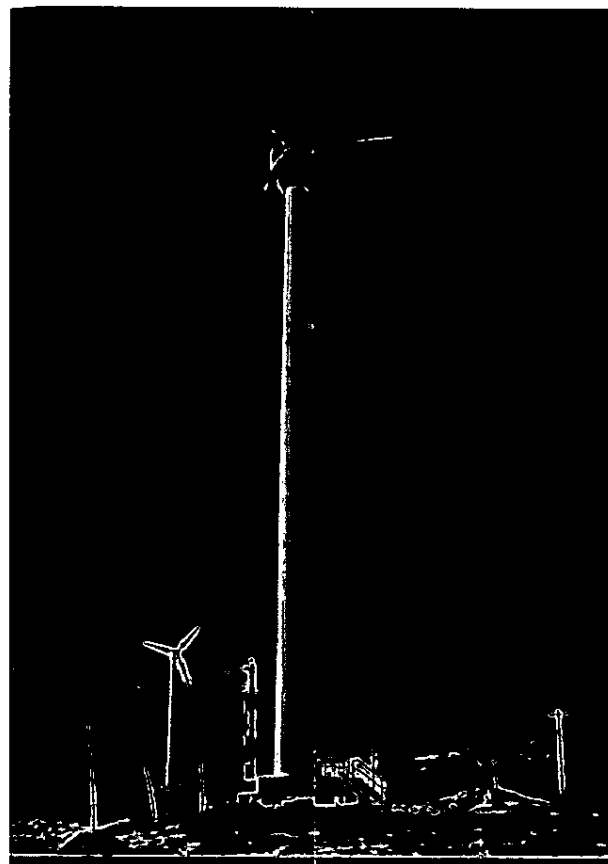
WORLD CLASS WIND-DIESEL
OPERATOR TRAINING

www.avtec.edu



Wind-Diesel Training Objectives

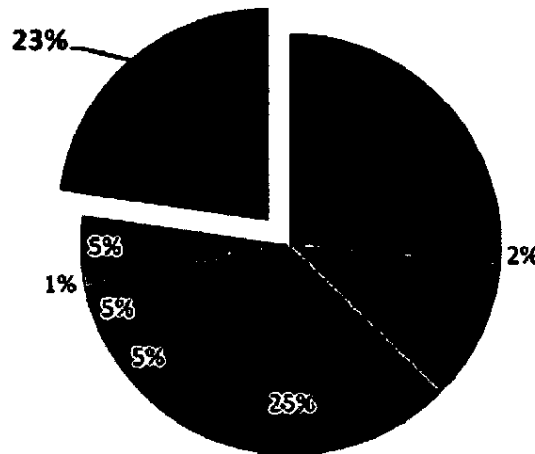
- Establish a world-class wind-diesel program that supports the interests of stakeholders from across Alaska
 - Wind-Diesel System Owners/Operators
 - Rural Alaska Electricity Cooperatives
 - Alaska Energy Authority
- Create “hands-on” educational opportunities through an on-campus wind-diesel installation
- Utilize standardized, proven, and relevant technologies for Alaskan applications



www.avtec.edu

Wind-Diesel Program Benefits

- Currently, no wind-diesel training programs exist within the state of Alaska
 - Approximately 20 unique utility scale wind projects are currently in operation across Alaska
 - Alaska's Renewable Energy Fund will support a significant number of new wind energy projects



*Alaska Renewable Energy Fund
Round I Grant Applications by
Technology (October, 2008)*

Biofuels
 Biomass
 Natural Gas
 Geothermal
 Heat Recovery
 Hydro
 Other
 Solar
 Tidal
 Transmission
 Wind

www.avtec.edu



Wind-Diesel Program Benefits

- Historically, rural Alaskan wind-diesel system operators have been sent out of state to receive necessary training
- AVTEC Program will be based on successful training program already established by Alaska's largest wind energy system owner (AVEC)

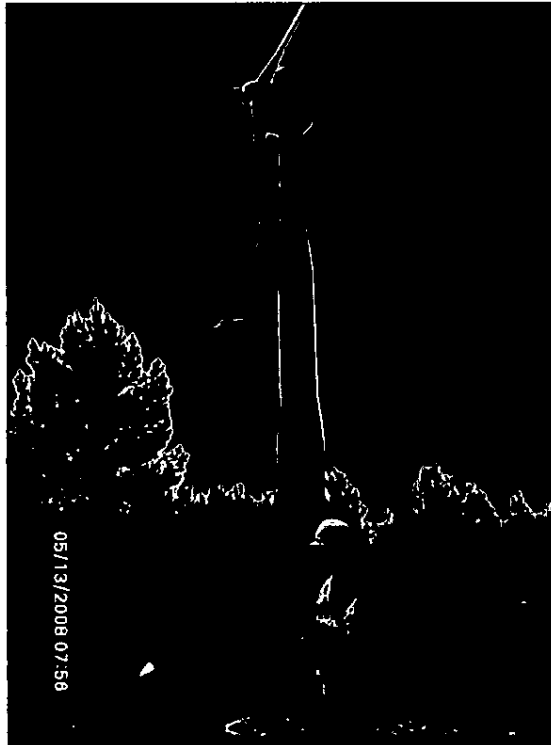


www.avtec.edu



Wind-Diesel Program Benefits

- Alaska based program will significantly reduce training costs while providing opportunities for expanded curriculum (introduction, intermediate, advanced, etc.)

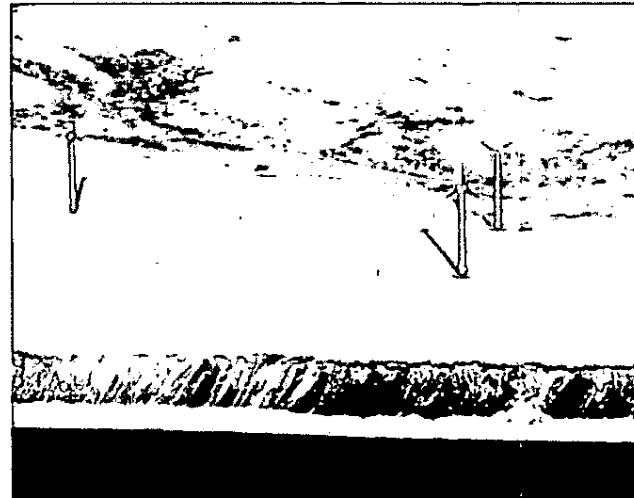


www.avtec.edu



Wind-Diesel Program Benefits

- Operating cost reduction at the school's industrial electricity facility
- Total net energy production estimates are 100,756 kWh annually which would save AVTEC approximately \$7,300 each year based on current electricity rates



www.avtec.edu