

Program Review Report

Energy Technician
Program at
Sitting Bull College

2012-2013

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Executive Summary

Program Description Summary

The Energy Technician program at Sitting Bull College is designed to train students to become entry level operators in energy production facilities, such as oil refining, electrical power production, and renewable fuel production facilities like ethanol, wind energy, and biodiesel plants. Other related job opportunities include; maintenance mechanics, heating boiler operators, water and wastewater treatment, and as energy audit technicians.

This program is accredited by the State of North Dakota and by the North Central Association (NCA) of Colleges and Schools' Higher Learning Commission. Upon successful completion of this program students will receive an Associate in Applied Science (A.A.S.) degree in Energy Technology. Many energy facilities require this degree as a prerequisite for application for entry level employment. Employment in the field of Energy Technology is expected to grow faster than average for all occupations throughout the next decade due to population growth and increased economic activity centered on North Dakota's oil and gas industry.

Program Self-Evaluation Summary

The Energy Technician Program has two part-time staff members, Lee Husfloen and Rick Kerzman who are both certified by the North Dakota Career and Technical Education Department to teach Energy Technologies at the post-secondary education level; Mr. Husfloen and Mr. Kerzman share the teaching duties of the 11 classes making up the core requirements of Program. Mr. Husfloen and Mr. Kerzman also share teaching duties in the Applied Math class of the General Education requirement for the A.A.S degree.

Courses are taught at the Trades Center on the Sitting Bull College campus. Course content is delivered in a variety of modes to meet the students' needs, e.g. face to face lecture, online, hands-on, and simulation laboratory. To assist the students in their academic pursuits, they are encouraged to utilize the Academic Center of Excellence. The Center assists the students in improving their study and writing skills. The SBC library also supports students as it provides a variety of media resource for student usage. Wireless internet is available campus wide to allow students to easily access all of the resources of the World Wide Web.

Every year the Energy Technician Program faculty members and advisory committee examine the Energy Technician course offerings relative to their alignment with similar programs at other post-secondary institutions. Changes have been made in the past in

order to keep the program aligned with emerging and developing technologies in the energy sectors with some courses eliminated, some added, and others modified. For example, we have expanded our offerings of Environmental Protection and Renewable Energy classes, while dropping the second level of our instrumentation training.

Program Planning Summary

Program planning is a part of the ongoing assessment process of the Energy Technician Program. Annual analysis of our program outcomes allows program adjustments in any needed area. This analysis of program activities and outcomes plays a major role in program planning, with additional input from the advisory committee, to meet the needs of the students and the changing needs of the Energy industry.

Comprehensive Analysis

Role of the Energy Technician Program within SBC

The Energy Technician Program at Sitting Bull College fulfills a role for the College regionally to supply a skilled workforce for existing energy processing facilities. It also addresses as the burgeoning number of new facilities that are coming online in oil and gas productions areas around the Standing Rock Indian Reservation. As the populations grows, the need for additional water and waste water facilities and operators to man these facilities will also increase. North Dakota Job Service predicts a 86% increase (25,000+ jobs) in North Dakota's energy technology related workforce between the years 2010-2020. The Energy Technician student will develop a firm foundation in Energy Technologies to prepare for these type of employment increases, or as a stepping stone for seeking an advanced degree.

The Energy Technician program strongly supports the following Student Outcome goals from the Sitting Bull College strategic plan; Goal 1- Students will be able to communicate effectively, both orally and in writing, synthesizing critical thinking skills; Goal 4- Students will be able to work effectively with others in a cooperative manner; Goal 7 - Students will become respectful citizens of the Earth.

Program Outcomes for Associate of Applied Science in Energy Technician:

1. The student will learn uses and names of equipment and system procedures of an energy production plant.
2. The student will learn the principles of safety, health, and environment along with the procedures required to perform as an individual and as a team member within the plant.
3. The student will gain the knowledge of ability to operate equipment in a manner that assures he/she is practicing environmentally sound work habits.
4. The student will learn math that is related to plant operation and performance including: mathematical fundamentals; work problems requiring algebra, conversions, and process flows; performance of calculations necessary for obtaining efficient plant operations.
5. The student will study and become familiar with the plant process flow, instruments and instrumentation systems.
6. The student will identify green energy sources and describe commercial and residential production methods.
7. The student will identify the main components of industrial wind turbines and solve selected electrical problems using Ohms and Kirchoff's laws.
8. The student will identify and describe environmental laws that affect the production of energy in the United States.

Associate of Applied Science in Energy Technology Degree Plan

General Education Requirements

ENGL	110	Composition I.....	3 cr.
ETT	113	Applied Math	4 cr.
COMM	110	Speech	3 cr.
HPER	210	First Aid/CPR/AED	2 cr.
PSYC	100	First Year Learning Experience	3 cr.
SOC	100	Transitions-Graduation & Beyond.....	2 cr.
NAS	101	Lakota/Dakota Language I.....	4 cr.
CSCI	101	Introduction to Computer Applications	3 cr.

Total General Education Requirements 24 credits

Energy Technician Core Requirements

ETT	111	Introduction to Process Technology	4 cr.
ETT	112	Safety, Health, and Environment	4 cr.
ETT	114	Technology I - Equipment	4 cr.
ETT	115	Hydrocarbon Chemistry.....	4 cr.
ETT	116	Instrumentation I.....	4 cr.
ETT	211	Plant Science.....	4 cr.
ETT	212	Technology II - Systems	4 cr.
ETT	213	Unit Operations.....	4 cr.
ETT	217	Renewable Energy	4 cr.
ETT	218	Wind Turbines/Electricity	4 cr.
ETT	219	Environmental Protection	4 cr.
ETT	297	Energy Technician Internship.....	3 cr.

Total Core ETT Requirements47 credits

Total Degree Requirements..... 71 Credits

Program Personnel

Energy Technician Instructor Lee Husfloen has over 40 years of experience in the energy field, both as a ND State Board certified instructor and as a technician/manager in the power generation, rural electrification, and boiler operations fields. Energy Technician Instructor Rick Kerzman has over 22 years of experience as a ND State Board certified instructor and technician/manager in the oil refining, oil pipeline, and gas processing fields. Both Mr. Husfloen and Mr. Kerzman have been actively involved in renewable energy projects, such as wind farms, geothermal power, and solar energy application.

Program Productivity

The Associate of Applied Science Energy Technician program has a history of variable enrollment. Student enrollment has generally been skewed towards predominately male as is the case with Energy Tech programs nationwide. The table below depicts enrollment and graduates for the past five years:

Semester Year	Fall 2008	Spring 2009	Fall 2009	Spring 2010	Fall 2010	Spring 2011	Fall 2011	Spring 2012	Fall 2012	Spring 2013
ETT Students Enrolled	5	3	7	4	3	1	8	6	8	6
Total SBC Enrollment	307	325	284	320	316	302	315	333	278	254
ETT % of Total Enrollment	1.6%	0.9%	2.5%	0.9%	0.9%	0.3%	3.7%	1.8%	2.9%	2.4%
ETT Graduates	1		1		1		0		6	

Sitting Bull College enrollment during the 2012-2013 Fall and Spring semester was down significantly from the average of the prior four years, while the Energy Technician Program enrollment has stayed fairly constant, albeit low. The surplus of jobs in the energy sector currently in North Dakota is thought to be a contributing cause of low enrollments as traditionally when the job market is strong, it has a negative impact on people seeking post-secondary education. The Energy Technician department goal is to increase enrollment to 15 students in the next two years.

Program Revenue

Available data itemizing tuition and Indian Student Count (ISC) revenue for the Energy Technician program, academic years 2009 through 2013, is itemized below:

	Energy Technician Program Income					
Year	Fall ISC	Spring ISC	Tuition	Total	SBC Total	ETT % of SBC Total
2008-2009	\$10,379	\$8,833.50	\$ 11,500	\$30,713	\$ 2,357,102	1.3%
2009-2010	10,800	9,875	20,675	41,350	2,590,347	1.6%
2010-2011	7,198	10,470	13,600	31,268	2,510,381	1.2%
2011-2012	24,076	30,921	35,200	90,198	2,813,554	3.2%
2012-2013	17,940	19,510	26,700	64,150	2,258,116	2.8%
Total 2008-13	\$70,393	\$79,610	\$107,675	\$257,679	\$12,677,323	2.0%
Ave. 2008-13	\$ 14,079	\$ 15,922	\$ 21,535	\$51,536	\$ 2,535,465	2.0%

Program Budget

The expenditures of the budget include the salaries of two part time instructors and the 7.65% FICA tax.

Energy Technician Five Year Budget					
	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Salary	\$28,000.00	\$28,000.00	\$28,000.00	\$28,000.00	\$28,000.00
FICA Tax @7.65%	2,142.00	2,142.00	2,142.00	2,142.00	2,142.00
Total	\$30,142.00	\$30,142.00	\$30,142.00	\$30,142.00	\$30,142.00

Advisory Committee

An advisory committee comprising members employed in the Energy Industries and SBC personnel supports the Energy Technician Program. The committee assists with suggestions designed to improve specific content areas; industry standards, the updating of curriculum, purchase of new instructional materials or equipment to modernize the classroom, and adopting safety policies for faculty and students. The committee *currently is comprised of the following members:*

Larry Metzger	BNI Coal Electrician -Retired
Todd Bornemann	Owner- Central Machining
Keith Johnson	Warehouse Supervisor- Dakota Gasification
Dan Schmidt	Director Power Programs – Bismarck State College
Bill Wahlman	Plant Manager- Great River Energy

Summary of Advisory Meetings

Meetings are held regularly at the end of each semester. Attendance by the advisory committee has been excellent. The fall meeting is usually held in December and is usually only the Energy Technician advisory committee meeting. The spring meeting is a group meeting of all of the Sitting Bull Programs that utilize advisory committees. The spring meeting consists of each SBC program providing a short description of their program and the program activities over the course of the previous period and their plans for the upcoming year. Advisory committee members can provide recommendations and suggestions for programs; comments are generally positive. The spring meeting ends with a vote whether to continue specific programs.

The Energy Technician Advisory Committee has been very vocal about having our program keep pace with the ever changing landscape that Energy Technicians must be aware of, and skill sets that must be developed to compete in today's job market. For example, our instrumentation training was augmented to include more SCADA training based upon committee input.

Program Self-Evaluation

Faculty

The Energy Technician Program is comprised of two part time instructors; Lee Husfloen and Rick Kerzman. The instructors teach classes on safety, plant science, instrumentation, plant operations, hydrocarbon chemistry, plant systems, plant equipment, environmental protection, and renewable energy systems. Both instructors currently possess their 5 year post-secondary teaching credentials through the North Dakota Board of Career and Technical Education. Both Instructors are also currently involved in the energy industry, with Mr. Husfloen working with the sitting and

regulations governing Wind Farms in Oliver County North Dakota, and Mr. Kerzman working as the Health, Safety, and Environmental Manager for BakkenLink Pipeline LLC., Great Northern Midstream Marketing and Gathering LLC, and ND Land Holdings LLC.

Student Relations

The instructors in the Energy Technician Program try to maintain an effective mentoring relationship with the program's students by actively listening to their concerns and remaining open-minded about different ways to approach their different learning styles. Class sizes in the past five years have ranged from one to eight students. Classes are offered face to face in the evenings, with an online component making up the rest of the class delivery. Electronic projection is used in the classroom for presentations, which allows slideshows, streaming and recorded media to be seen by students as a group. Materials developed by the instructors, as well as outside training resources, are utilized as appropriate. The students would like and need more lab and hands on activities. The instructors, in conjunction with support from the Colleges' administration, have been consistently upgrading the resources for the program to achieve this goal.

Curriculum Content, Design, and Delivery

Assessments of the learning outcomes of the Energy Technician Program are collected and reviewed throughout the academic year. These findings assist in recommending any changes to the curriculum content, design and delivery. For example, instructors conduct more hands-on learning activities and lab work and do less classroom lecture. Input is also gathered from assessment committee members as the learning outcome assessments are shared annually with the committee.

Institutional Support

The College has been very supportive of the Energy Technician Program. The instructors are asked to provide lists of equipment needs and grant funding had been used to provide us with more equipment for hands on training activities. Updated curriculum materials have also been recommended by the advisory committee and provided by the institution. All of the core courses for the Energy Technician Program are delivered in the new Trades Center on the SBC campus. The Trades Center offers well lit classrooms with a variety of options for multi-media delivery of educational material. A dedicated computer lab is also available for our students in the Trades Center. The college also supports the Energy Technician Program by offering a student center, writing lab, library, career counseling services and support staff so these student resources are readily available.

Academic assistance in the form of tutoring is available to students individually and in group settings. These tutoring services are available to all students in the Energy Technician program, with the institution continuing to explore further opportunities to meet the student tutoring needs for courses within the A.A.S. degree core requirements.

Energy Technician students are given the opportunity to participate in Student Government, American Indian Business Leaders, SBC's Culture Club or the annual American Indian Higher Education Consortium competitions.

Importance to the College and other Programs

The Energy Technician Program first and foremost educates Sitting Bull College students on their responsibilities involving stewardship of earth, air and personal protection. This training dovetails with the colleges Environmental Science classes and works to fill critical infrastructure support roles within the community. Energy Technician graduates of the past five years are employed in Oil Refining, Power Generation, and Water/Wastewater treatment positions both on and off the Standing Rock Reservation. Some of the facilities they are employed at include Tesoro refinery, Dakota Gasification company, Antelope Valley power station, Wapakala water treatment plant and city of Mobridge water plant. The Energy Technician Program, being an Associate in Applied Science degree program, also provides the general education faculty with additional students while obtaining their 24 credits of general education credits.

Internships provide the student opportunities to gain supervised, practical experience working in an Energy Technician related position. The majority of the internships are non-paid positions with no cost to the provider, and the students are required to log 135 hours during the internship. The Energy Technician internship is a core class and is supervised by the ETT instructor and advisor, Lee Husfloen.

Obstacles and Opportunities

The biggest obstacle facing the Energy Technician training program is the lack of dedicated lab space in the Trades Center. As we continue to seek additional lab and simulation equipment, there is a need for a dedicated space to house this equipment. Due to the lower numbers currently in our program the computer lab at the Trades Center is adequate for our needs, but would be in adequate when our numbers in the program grow to meet our goals. Also, building access has been a problem for Energy Technician Instructors, as they do not have keys for the building. A department need is to secure additional funding for simulation equipment to assist the students with hands-on learning in the safety of a classroom, instead of out in the field, on the job. Additional funding would also assist in purchasing resources such as DVD's demonstrating core concepts of safety and operations in the energy field.

The opportunities existing for the Energy Technician program are many. The whole energy related industry continues to grow at a very fast pace, due to all of the energy development activities going on in the region. Increased marketing of the program offerings should return an increase in students to the college.

An obstacle to our graduation rates is retaining students. According to the U.S. Department of Education, National Center for Education Statistics, historically, Native American students typically stop-out at least once during the procuring of their educational degree. Many students have a number of "stop-outs." Efforts are being undertaken to address this challenge and retain the students with minimal stop-outs. To address this institutional trend, SBC has formulated a retention management plan. The Energy Technician program has developed a number of suggested course sequences through the AAS degree program, for example:

**SUGGESTED SEQUENCE FOR STUDENT PROGRESSION THROUGH THE ASSOCIATE OF APPLIED
SCIENCE IN ENERGY TECHNICIAN**

A suggested sequence through the Energy Technician Program, incorporating all prerequisites, is shown below. This sequence would allow the student to complete the program in four semesters, with no summer courses.

Fall Term 1

ETT	111	Introduction to Process Technology	4 credit hours
ETT	112	Safety, Health and Environment.....	4 credit hours
ETT	113	Applied Math	4 credit hours
PSYC	110	Psychology of Student Success.....	3 credit hours
HPR	106	First Aid/CPR.....	2 credit hours

Total Credits

17 credit hours

Spring Term 2

ETT	114	Technology I - Equipment	4 credit hours
ETT	115	Hydrocarbon Chemistry.....	4 credit hours
ETT	116	Instrumentation	4 credit hours
ENGL	110	English I.....	3 credit hours
CSCI	101	Introduction to Computer Applications.....	3 credit hours

Total Credits

18 credit hours

Fall Term 3

ETT	211	Plant Science	4 credit hours
ETT	212	Technology II - Systems.....	4 credit hours
ETT	213	Unit Operations	4 credit hours
COMM	110	Speech.....	3 credit hours
NAS	101	Lakota/Dakota Language.....	4 credit hours

Total Credits

19 credit hours

Spring Term 4

ETT	217	Renewable Energy.....	4 credit hours
ETT	218	Wind Turbines/Electricity.....	4 credit hours
ETT	219	Environmental Protection	4 credit hours
ETT	297	Energy Technology Internship.....	3 credit hours
SOC	100	Job Seeking Skills	2 credit hours

Total Credits

17 credit hours

TOTAL DEGREE REQUIREMENTS71 credits

Program Planning

Every two years the faculty members and advisory committee have examined the Energy Technician course offerings in relation to similar programs at other post-secondary institutions. Changes have been made in order to keep the program up to date and competitive; some courses have been eliminated, others modified, and new courses added. Classes in renewable energy, wind turbines and environmental protection were added, while classes involving the second level of instrumentation, basic electricity, and level two operations were eliminated

It's evident that there are numerous Energy Technician employment opportunities available in the region served by Sitting Bull College, and across the state of North Dakota and that there are likely to be even more openings in the near future. The challenge is making certain that potential students will consider SBC for their higher education choice. SBC has been able to offer financial assistance for student needs through Grant funding in addition to the usual Pell Grant and other scholarships.

Additional funding for the Energy Technician Program would assist in purchasing simulation software and mechanical laboratory equipment to more fully complement our new curriculum materials. Dedicated lab space will have to be obtained in the Trades building to allow for the use of the equipment however.

Trends

With the recent growth of the energy industry, workforce supply is an ongoing challenge. In an effort to address the issue, industry, government and education stakeholders are collaborating to inform students about Energy Technician career opportunities and the potential education pathways to secure these positions.

According to Job Service North Dakota, the oil and gas, utility, and transportation industries in North Dakota will see an increase of 86% in the size of the workforce in the years 2010-2020. This equates to an increase of just over 25,000 jobs in these Energy Technician related industries. Many job openings can be found daily on the job service website, and employers are clamoring to find skilled workers for these positions. This information is illustrated graphically on the following Job Service table.

Industry Employment & Projections data in North Dakota from Base Year 2010 to Projected Year 2020.

Industry Code	Industry Title	2010 Estimated Employment	2020 Projected Employment	Total 2010-2020 Employment Change	Annual Avg. Percent Change	Total Percent Change
210000	Mining, Quarrying, and Oil and Gas Extraction	10,675	27,190	16,515	9.80%	154.7%
220000	Utilities	3,419	3,633	214	0.60%	6.3%
480000	Transportation and Warehousing	14,888	23,184	8,296	4.50%	55.7%

Source: Labor Market Information Center, Job Service North Dakota, Projections Unit

Appendix

Program Review Participants

(QHUI, 7HFKQLFLDQ Program, 2013

<u>Participant Name and Title</u>	<u>Date</u>
Dr. Deborah His Horse Is Thunder, Ph.D. : External Reviewer	March 2014
Rick Kerzman Energy Technician Program, Instructor	March 2014
Lee Husfloen Energy Technician Program, Instructor	March 2014

Date of Submission

March 28, 2014

Appendix

Completed Program Review Signature Page