Post-Audit Review

For Occupational Programs Implemented Under the Provisions of Series 37

West Virginia Council for Community and Technical College Education

Institution: Eastern West Virginia Community and Technical College
Program (Degree and Title): Wind Technician Certificate In Applied Science

I. Introduction

The Wind Technology (WTT), CAS program provides a technical education at the certificate level. Through instruction and practical application, students gain knowledge and skills required to perform maintenance in modern manufacturing facilities and wind turbine generation facilities.

Successful completion of the Wind Certificate program will allow graduates to enter the workforce at the technician level. They are prepared to apply the knowledge and skills developed in lectures and laboratories to diagnose, troubleshoot and repair wind turbines and other industrial machinery.

Students learn to comply with personal and environmental safety practices associated with clothing; eye protection; hand tools; power equipment; proper ventilation; and the handling, storage and disposal of chemicals/materials in accordance with local, state, and federal safety and environmental regulations.

The Wind Technician curriculum prepares graduates to work in the wind industry, as well as, other types of manufacturing and industrial maintenance. Typical salaries for Wind Technicians and other industrial maintenance employees in our area range from $15 to $25 dollars per hour. In addition, most large maintenance shops include medical and other benefits.

II. Goals and Objectives

The program was developed with the help of local wind farms and industries throughout Eastern WVCTC's six county service area. The goals of the program were to educate individuals with minimal previous experience in industrial maintenance or the wind industry. The program began with a discussion of need with local and developing wind farms and progressed to utilize the DACUM process to develop the proper curriculum.

Program Need

The program was developed as a result of discussions with FPL, NED Power, Dominion Power and AES Energy. These entities were either established wind farms or were in the early stages of building wind power generation facilities in close proximity to Eastern WVCTC.

The Potomac Highlands Region of West Virginia does not offer a post-secondary program in Wind Energy Technology that prepares its graduates to enter the highly technical and competitive industry. Emphasis will be directed to preparing the graduates to understand various industrial maintenance standards and safety procedures. These trainings will enable the program graduates to obtain jobs that pay an average wage of $20.00 to over $25.00 per hour. The closest similar wind technician training degree programs are located in the mid-west and western portions of the United States. All of the Career and Technical Education adult and secondary students in Eastern's service region would have to travel out-of-state to specialty schools to obtain the skills necessary to repair and operate high tech wind power generation equipment. Other Schools of note are:

- Iowa Lakes Community College
- Texas Technical College
- Walla Walla Community College

This program is now offered at the EWVCTC Technology Center located in Petersburg, WV.

III. Assessment

Program Level Assessment

The assessment of the Certificate in Wind Energy Technology will follow assessment instruments and standards to discern student academic achievement and course effectiveness in meeting the certificate goals and course outcomes.

- Completion Rate/course level: At least 80% of students enrolling in the certificate will successfully complete the course(s). This will be determined after registration each semester based on enrollment numbers. At least 80% of the students will demonstrate mastery of the course outcomes by earning at least a 70% average in each course through a variety of classroom assessments.

- Course-level effectiveness: Course outcomes for all of the Wind Energy Technology courses will be assessed. At least five outcomes from each course

will be assessed. Exam questions linked to course learning outcomes will be included in the final exam.

- Persistence Rate: Students in the Certificate in Wind Energy Technology will be tracked throughout their certificate program to determine persistence through Certificate completion.

- Graduation Rate: At least 70% of students enrolling in the Certificate in Wind Energy Technology will successfully complete the certificate within a reasonable time based on full-time or part-time implementation. This will be measured by the number obtaining the Certificate.

- Syllabus Analysis: Syllabus analysis will be conducted on an annual basis to assure consistency of outcomes with Mater Course Record Forms and among sections of specific courses.

- Transcript Analysis: Transcript analysis will be conducted as triggered by deficiencies in course level assessment activities.

- Advisory Committee Review: Annual advisory committee review will provide qualitative evaluation of program effectiveness in meeting regional paraprofessional educator needs.

- Course evaluation surveys will be used as indirect assessment measures of student success and satisfaction.

- Graduate Placement Rate: Tracking of students completing the Certificate in Wind Energy Technology will be done by a survey to determine the number of graduates obtaining employment in their field of study. The survey will include questions to collect data on location, salary, job preparedness, and reasons why graduates are not working in their field if applicable.

All technical courses are assessed on a two year cycle. Student observation task sheets and exams serve as the data source for course learning outcome assessment.

IV. Curriculum

A. Include a summary of degree requirements (including entrance standards and exit standards) and provide commentary on significant features of the curriculum.

B. Provide a list of courses along with the number of credit hours required for each course. Include specific course titles and numbers. Label as Appendix I.

C. Submit a listing of the course delivery modes.

A. Summary of Degree Requirements

The Wind Turbine Technician Certificate program requires students to be capable of computations in Algebra as well as reading comprehension and communications. Recent changes require students to complete a college level math to obtain a certificate. Significant features of the WTT program are the actual hours of "hands on" experience. Many of the students entering these certificate programs are tactile learners and tend not to do as well in lecture only courses. We have designed the courses to not only teach basics and fundamentals, but to help students understand why they need to learn these functions of math and reading comprehension. The program incorporated multiple instructional methods to address diverse learning styles.

B. The courses lists with credit hours are listed in Appendix I.

C. Course Delivery Modes

These courses all have a lecture and a laboratory component where students get hands on experience working on systems and equipment. Computerized trainers are incorporated throughout the curriculum to enhance the learning opportunities. All trainers can be programmed to provide additional emphasis on specific technical skills as deemed appropriate through assessment or advisory committee recommendations. Students learn all areas of wind turbine and industrial basic maintenance. The following are skills emphasized by the Energy and Manufacturing Sector Committee:

- Apply accepted safety and health practices in the workplace.
- Use proper tools and instrumentation to diagnose, troubleshoot and repair industrial systems.
- Use proper tools and instrumentation to diagnose, troubleshoot and repair wind turbine mechanical systems.
- Provide proper documentation as to the nature of, the diagnostics equipment utilized and solution to complex problems.
- Demonstrate the proper use of lock out devices and electrical checks to maintain personnel safety.
- Demonstrate proper climbing and rappelling techniques to safely exit a Wind Turbine in case of emergency.
- Apply effective written and oral communication skills.
- Demonstrate computer literacy.

V. Faculty

Submit information on the total number of full-time and part-time faculty utilized per year to deliver the program. Use Appendix II forms. The narrative should summarize points relating to faculty teaching courses within the major

(percentage of faculty holding tenure, extent of use of part-time faculty, level of academic preparation, etc.) Data on part-time faculty may be abbreviated, but should minimally include academic degree held and list of courses taught.

The Wind Turbine Technician Certificate training Program currently utilizes three instructors. Mr. Landes is our full time faculty. He has 30 years of industrial maintenance and electrical experience. Our second faculty member is Mr. Hipp who is an adjunct faculty. Mr. Hipp is employed as a full time instructor at the South Branch Career and Technical Center, he is their industrial maintenance and electrical/electronics instructor. Our third adjunct instructor is Mr. Boward, who is our OSHA and Safety instructor. Data on individual instructors, their education and courses taught are contained in Appendix II. All of our instructors have many years of professional experience ranging from 7 – 30 years in industry and 2 to 20 years in educational settings.

VI. Enrollment and Graduates

A. Submit data indicating the headcount and full-time equivalency (FTE) enrollment along with the number of graduates for each year the program has been in existence. Label as Appendix III.

Wind Turbine Certificate students are in many cases nontraditional learners. Most have families and obligations. As such they cannot attend full time classes, which is very typical in a community college. Unfortunately many take several years to complete the certificate program, and in many cases, obtain jobs and elect not to continue to obtain the two year AAS Degree.

B. Provide information on graduates in terms of places of employment, starting salary ranges, and number employed in the field of specialization. Include evidence and results of follow-up studies of graduates and employers. The studies should indicate graduate and employer satisfaction with the effectiveness of the educational experience. A summary of the results to be included should indicate the number of individuals surveyed or contacted and the number of respondents.

Students graduating in the WTT Certificate program are trained in the basics of industrial/wind maintenance and safety. Their salary ranges in local industrial and wind areas range from $15-$20/hour. Most without additional experience will begin at the lower end of the pay scale. Some graduates have elected to drive or to move to other areas to obtain a higher salary.

Current employers are American Woodmark, Moorefield WV; Mitsuibishi Industrial Power, Keyser WV; Nextera Energy, Parsons, WV; AES Power, Elkins

WV; Nordex Power, Oakland, MD; Edison Mission Power, Keyser WV and Meyersdale PA

C. Present information on the success of graduates in achieving acceptance into baccalaureate programs.

To date students have not continued their education beyond our programs to pursue a baccalaureate degree. This program was designed as a terminal degree program and targeting employment opportunities. It has not been designed as a 2+2 however, some courses are transferable and recent discussions with Potomac State College of WVU may allow students to enter a BAS program.

VII. Financial

A. Indicate the annual total expenditures to deliver the program and source(s) of funding for the program. Include departmental resources, state appropriated funds, grants and contracts, state funds and student fees.

Currently the full time faculty is being funded thru a state grant for FY 14 and into FY 15. Other adjunct faculty salaries are being paid as part of Eastern's annual budget. Originally all salaries were part of grant funding, which has expired for adjunct salary use. The Wind Turbine Technician program currently has good registrations and persistence. Many technical programs find it difficult to completely fund the operation of the program purely through tuition, however, if current enrolments sustain, the Wind Turbine Technician program will be nearly self-sufficient. That is assuming that the entire amount from student enrolment is funneled into this program and is not utilized to fund General Education. Student to instructor ratios are relatively low, typically less than 12 students per class. A total of over one million dollars in grant funding was obtained by Eastern in establishing the Wind Turbine Technician Program.

The cost of instruction, annual fees and consumables equate to nearly $55,000. The cost of the facility is not included in this calculation. Looking at a planned enrolment of 15 first year and 12 second year full time students the annual tuition collected would be approximately $ 64,000.

Additionally laboratory fees collected for these technical courses will average $315 per student for the certificate program, adding an additional $4500 to the program.

We have spent considerable time and resources to market our program throughout our district and beyond. Eastern does lease a separate facility for the technical programs, which is an additional expense shared by the

Automotive, Electromechanical, Wind Technician, CDL truck driving, and Adult Basic Education. The facility is on a lease to own agreement with the Grant County Development Authority costing $60,000 per year.

B. Identify projection of future resource requirements and source of funding.

Future operation of the program looks promising, especially since we see continued enrolment and interest in the program. If, however, there is a drop in enrolment it will be like many other Technical programs, and will not be self-sufficient. The automotive, wind, electromechanical, CDL trucking program and the Adult Basic Education programs will all share in the facility expenses and overall will help support the program offerings.

VIII. Advisory Committee

List all advisory committee members. Provide information on how the advisory committee has been utilized for program improvement.

Because two programs have merged below are the advisory members for both the Electromechanical and the Wind Technician Programs.

Doug Vance	Edison Mission Energy, Wind Farm Manager, Berlin PA
Joseph Watts	Warrior Run Power Station, Cumberland MD
Eldridge Bright	NextEra Energy, Wind Farm Manager, Parsons, WV
Chuck Burley	Warrior Run Power Station, Cumberland MD
David Leary	Former maintenance technician Florida Power and Light, Parsons, WV
Grover Duling	Eastern Wind Consultant
Mike Hipp	Instructor South Branch Career and Technical Center
Jim Spurling	Instructor Mineral Co. Vocational Center
Chris Meehan	Invenergy LLC, Wind Farm Manager, Greenbrier County, WV

Additional industry and education members will be added in the future.

The advisory committee has been instrumental in determining the course curriculum and overall content. The advisory committee was integrally involved in all levels of program development from the initially conceptualization of the program, needs assessment and curriculum content. The group listed above was involved in the original DACUM process. With implementation, the program courses are continually assessed and changed at the recommendation of both the faculty and the advisory committee. Students who are working in the field have also provided recommendations to strengthen the curriculum.

IX. Accreditation

Is an accreditation process available in this field of study? If so, what is the accreditation status of the program?

There are no Wind Technician standard certifications. Several Colleges in the Mid West are currently designing what they hope to be a Nationally-accepted Wind technician registry. Areas of certification in electrical licensing and mechanical trainings may be available, but are not directly related to the Wind Industry.

APPENDIX I
Required Courses

The Certificate in Wind Technician Technology will include the following courses:

General Education:

- CIS 108 – Computer Fundamentals 3 credit hours
- ENL 101 – English Composition 3 credit hours
- MTH Elective 100 Level or higher 3 credit hours

Required Technical Courses:

- WTT 100 – Intro to Wind Technology 2 credit hours
- WTT 110 – Wind Safety and OSHA 4 credit hours
- WTT 120 – DC/AC Circuits 4 credit hours
- ELM 120 – Fundamentals of Fluid Power 3 credit hours
- WTT 150 – Electrical Practical Apps. 4 credit hours
- WTT 160 – Power Generation and Trans. 4 credit hours
- ELM 217 – Industrial Maintenance Fundamentals 3 credit hours

The Certificate will require a minimum of 33 credit hours.

The Certificate had to be updated to include a college level Math as well as a college level English as per recent requirement changes, as well, these changes took place in the Fall of 2012. This recent change has made it impossible to meet our industry requirements and to keep the certificate hours under 30.

APPENDIX II
Faculty Data

Name Michael Hipp Rank_____
Check one:
Full-time_____ Part-time_____ Adjunct X Graduate Asst._____

Highest Degree Earned _____ Date Degree Received _____

Conferred by_____

Area of Specialization_____

Professional registration/licensure WV K-12 Teaching Certificate
Master Electrician WV
EPA Technician Refrigerant Certification

Yrs of employment at present institution __7____
Yrs of employment in higher education _7____
Yrs of related experience outside higher education___23___
Non-teaching experience____
To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
2012 Fall	WTT-120 DC/AC Circuits	10
2013 Spring	WTT-150 Electrical Pract. Apps.	11
2013 Spring	ELM-210 Intro. To PLC's	11

(b) If degree is not in area of current assignment, explain.

Mr. Hipp is an industrial maintenance teacher at the South Branch Vocational Technical Center and has been an adjunct instructor for Eastern for seven years. He holds a Master Electrician License in West Virginia, and he is certified with the Environmental Protection Administration with a Technician Class Refrigerant Certification. Mr. Hipp has a private electrical/heating and ventilating contractor's license and business. He routinely teaches industrial wiring, maintenance, as well

as, hydraulic and pneumatic systems. Most recently he introduced programmable controller training to his students.

Name Charles Landes Rank _____

Check one:

Full-time X Part-time_____ Adjunct ____Graduate Asst._____

Highest Degree Earned BS Date Degree Received 1974

Conferred by West Virginia University

Area of Specialization Wood Industry

Professional registration/licensure _____
Yrs of employment at present institution 3
Yrs of employment in higher education 3
Yrs of related experience outside higher education 30
Non-teaching experience 38

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
2012 Fall	ELM 120 Fund. Of Fluid Power	15
2012 Fall	WTT 210 Wind Mechanical Systems	7
2013 Spring	WTT 160 Power Generation and Trans	8
2013 Spring	ELM 217 Industrial Maint. Fundamentals	10
2013 Spring	WTT 260 Wind Turbine Troubleshooting	10

(b) If degree is not in area of current assignment, explain.

Mr. Landes has a BS degree in Wood Industry Technologies but has been working in a supervisory and training position for most of his 30 years in industry. He routinely writes Programmable controller software, performs troubleshooting on electrical, pneumatic, and hydraulic systems. He also is quite versed in remote data acquisition and remote control of systems and processes. He has extensive

knowledge in programming multi axis Fanuc robots used both to pick and place, as well as, spray painting items.

Name Max Boward Rank_____

Check one:
Full-time_____ Part-time_____ Adjunct X Graduate Asst._____

Highest Degree Earned Masters Degree Date Degree Received 1996

Conferred by West Virginia University

Area of Specialization Safety and Environmental Management

Professional registration/licensure OSHA 10 Hour Construction Hazard Awareness
Scaffolding Competent Person Training
Mobile Crane Management Awareness
Trench and Excavation Safety 8 Hr Comp. Person
5 Hour Fall Protection Course
First Aid and CPR Trainer

Yrs of employment at present institution 4
Yrs of employment in higher education 4
Yrs of related experience outside higher education 13
Non-teaching experience 10

To determine compatibility of credentials with assignment:

(a) List courses you taught this year and those you taught last year: (If you participated in team-taught course, indicate each of them and what percent of courses you taught.) For each course include year and semester taught, course number, course title and enrollment.

Year/Semester	Course Number & Title	Enrollment
2011 Fall	WTT-110 Wind Safety/OSHA 30	14
2012 Fall	WTT-110 Wind Safety/OSHA 30 .	17

(b) If degree is not in area of current assignment, explain.

APPENDIX III
Headcount and Statistics on Graduates

	Headcount	FTE	Full Time	Graduates
Spring 2010	8			0
Fall 2010	20			0
Spring 2011	3	2.5	3	1
Fall 2011	4	2.1	1	1
Spring 2012	3	1.5	0	3
Fall 2012	6	4.9	4	5
Spring 2013	4	3.9	3	8
Total	48		11	18

Enrollment By Course	Spring 2010	Fall 2010	Spring 2011	Fall 2011	Spring 2012	Fall 2012	Spring 2013	**Total HC**
WTT 100: Intro to Wind Energy (2 Cr.)	8	13	18	29	7	12	6	93
ELM 120: Fundamentals of Fluid Power (3 Cr.)		9	10	11		10		30
WTT 110: Wind Safety (4 Cr.)		20	13	15		15		50
WTT 120:DC/AC Circuits(4 Cr.)		8	4	8		14		30
WTT 150: Electrical Practical Applications I (4 Cr.)		5	11	3	16		12	47
WTT 160: Power Generation (4 Cr.)			8		13		14	35
ELM 217: Industrial Maintenance Fundamentals. (3 Cr.)			6		19		15	40