



**Program Name: Renewable Energy Technology**

**Lead Faculty:** Abe Fouhy

**School:** Clackamas Community College, Oregon City, OR

**Course Name(s):**

IMT-215, Electromechanical Systems I, 3 credit

MFG-131, Basic Electricity II, 3 credit

MFG-132, Basic Electricity III, 3 credit

RET-200, Renewable Energy Systems, 4 credit

**Delivery Mode(s):** We provide 100% online to 100% face-to-face and anywhere between. Labs are done one Saturday per month for remote people, or via YouTube if they have applicable work experience to prove their skill proficiency.

**# of Credits:**

Power Generation and Transmission Sequence: three classes, for a total of 9 credits.

Energy Systems Maintenance Certificate: six classes for a total of 16 credits

Renewable Energy Certificate: fifteen classes for a total of 49 credits

Renewable Energy AAS: thirty two classes for a total of 97 credits

**Program Name:** Renewable Energy Technology

**When did the program start?** 2009

**What geographic area(s) do your students come from?** Oregon & Washington

**Number of Students in Program:** 30, ranges between 30-60.

**Demographics: Percentage Distribution**

Gender: Male: 89% Female: 11%

Ethnicity: Caucasian: 94.4%, African American: 0.6%, Hispanic: 3%, Other: 2%

Veterans: 11%

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**Degree(s)/ Diplomas(s) / Certificate(s) Offered:**

Certificate: Renewable Energy Systems Technology Certificate – 9 months

AAS: Renewable Energy Systems Technology Degree – 21 months

**How many Faculty teach energy courses at your college (note if FT or PT)?** 1 FT Renewable Energy, 1 FT Electronics and 2 PT Electronics, 4 PT Electricity, Motors, and Automation

**Description of Your Facilities (be sure to note any special lab facilities used for hands-on training):**

Last year we built a new Industrial Technology Center building, which has 8000 ft. of space for internal labs, 5 classroom spaces, 1 computer lab and a 11,200 ft. outdoor renewable energy space. In this location we build tiny homes in our green building program (new program companion of RET), two 1000 ft. solar installation roofs that have 240/208/277/480VAC 3 phase power hooked to the grid with live power to our 20kW solar PV systems, this hooks into our 220kW PV system on the roof. We also have a 5kW ground mounted PV system. Each of these solar systems use different racking, inverters and roof types. We have a small AC coupled 9kW microgrid hooked into this system.

We have two tiny houses we use for tiny home building, weatherization and energy auditing. We teach weatherization and energy auditing to the BPI envelope and shell standards. This course teaches to the LEED Green AP standard.

We have two 80-gallon biofuel stations, one for ethanol and one for biodiesel. We are working with chemistry and horticulture to teach a cross-student population in biofuels and ASTM grade fuel testing.

Our internal lab has woodworking, metal fabrication, and manufacturing space (the manufacturing department is in our building which is about 34,000 ft. of manual and CNC machines). We have a series of PV/Wind trainers, hydraulic/pneumatic trainers, mechanical system trainers, electromechanical energy management system (EMS) trainers and a simulated SCADA EMS integrated system. We also have an electronics and automation lab, with digital multi meters, Oscilloscopes, motor controls, PLC, microcontrollers, etc.

We have a Maker Space with three industrial 3D printers, CNC machines, tinsel testers, small furnaces, three robotic arms, a plasma cutter, a 60W CO<sub>2</sub> laser, and a CNC vinyl cutter.

**Have you conducted a job market assessment? If yes, what were the findings?**

Yes, we continually talk with Portland regional employers. Students who wish to stay local, generally go into solar, weatherization, energy auditing, biofuel, building automation and manufacturing automation. Solar has a 23% growth rate and nearly 200 companies in Oregon, 60% of them are in Portland. Biofuels has a presence in rural farming, especially in the Willamette Valley areas focused on wine and beer

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production. Vestas's headquarters is in Portland so we train with them at their training center to teach wind to the Global Wind Organization standards for Wind turbine technicians. Vestas, GE and Siemens generally hire all our students wanting to travel and go into wind. In Oregon, we are unique in that we also have Tidal, Wave and Geothermal projects along with long standing Hydroelectricity. About 50% of our energy is from renewable energy, so if students want to travel within Oregon and Washington State, they have many opportunities and the demand is high for job placement.

**What do you think makes your program successful?**

Our program teaches practical hands-on training directly on the equipment they will use in the field. We teach direct application of renewables, and also fundamentals of a wide range of technology and skills that are used in several high paying positions. Renewable energy is an industrial system that just utilizes the technology in a different way. So, we focus on Energy Auditing, Solar Design & Installation, Wind Turbine Maintenance, and Biofuels but provide the knowledge to work on nearly any type of industrial system. This approach helps our students find high paying, long lasting careers with huge advancement without pigeonholing them into a particular field or industry.

**What are your industry ties? (If you have an industry advisory board, please describe its size and composition).**

We have an industry advisory board that consists of about fifteen Wind, Solar, Biofuel, Geothermal, Wave, Tidal, Energy Auditing, Farmers, ODOE, Energy Trust, PGE (a local utility) and Hydro industry professionals.

**Do you offer internships? What is your placement rate?** We currently don't place our students directly, but they are required to get an internship for 120hrs of work prior to graduation. They usually work for a wind, solar or building automation company during this time. We are looking into the idea of an apprenticeship model to have our students have a job starting day one and continuing all the way through the program and beyond. This would be provided to every student entering the program.

**Is there any additional information about your program and or school you would like to include (any recent awards, publications, grant awards that pertain to your program etc.)?**

We have been recognized by the Governor as a Program of Excellence. We received two grants from the Department of Labor to support the program and to help with retraining of displaced workers when a local paper plant went out of business.

**Program Link:** <https://www.clackamas.edu/academics/departments-programs/renewable-energy-technology-aas>

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