

# Renewable and Clean Energy Masters Degree Program



## Renewable and Clean Energy

The Renewable and Clean Energy (RCL) Master’s Degree Program was founded in 2008 to prepare students for engineering careers in renewable energy and energy efficiency. The RCL program provides a dynamic atmosphere for learning advanced engineering skills and preparing yourself for a career in the new clean-energy economy.

*“The clean economy ... employs some 2.7 million workers, encompasses a significant number of jobs in establishments spread across a diverse group of industries... the clean economy employs more workers than the fossil fuel industry and bulks larger than bioscience. Newer clean economy establishments—especially those in young energy-related segments such as wind energy, solar PV, and smart grid—added jobs at a torrid pace (8.3% per year compared to 4.2% per year of the overall economy).”* Brookings Institute, 2011.

## Courses

The program specializes in energy efficiency and renewable energy and offers advanced course work in thermo-fluids and large-scale energy systems. Courses include:

<u>Energy Efficiency</u>	<u>Renewable Energy</u>	<u>Energy Fundamentals</u>
Energy Efficient Manufacturing	Renewable Energy Systems	Energy Engineering I
Energy Efficient Buildings	Solar Energy Engineering	Sustainable Energy Systems
Design for Environment	Wind Energy Engineering	Energy Materials
Building Energy Informatics	Geothermal Energy Engineering	Electro-chemical energy conversion
	Advanced Photovoltaics	Advanced Thermodynamics
	Biofuels	Conduction
		Convection
		Fluid Mechanics

## Research

Under the guidance of faculty, students conduct research in energy efficiency, renewable energy and appropriate technology. Students receive academic credit for research through RCL 595 Research Project or RCL 599 Research Thesis. Some research is conducted in the newly commissioned Renewable and Clean Energy Laboratory. A list of research publications by RCL students is on the RCL website. Research centers associated with the RCL program include:

- Industrial Assessment Center: with funding from the U.S. Department of Energy, MORPC and others
- Building Energy Center: with funding from Dayton, Power and Light, Vectren, and others
- Ohio Center of Excellence for Energy and Environmental Informatics: with funding from the U.S. Air Force and others

### **Students**

The RCL program is home to about 50 graduate students. RCL students come from the U.S., Mexico, Puerto Rico, Venezuela, Columbia, India, Pakistan, Libya, China and other nations. The rich international learning environment has attracted three Fulbright Scholars. RCL students develop deep friendships with peers and professors. Extra-curricular activities including soccer, music and travel. RCL students participate in student-led groups including the Superhigh Mileage Competition, the SolarSplash competition and ASHRAE. RCL students have developed appropriate technology throughout the world through the ETHOS program including solar photovoltaic projects in Pakistan and solar refrigeration projects in India. RCL students study abroad in Ireland and Scotland.

### **Graduates**

RCL graduates become leaders and innovators in the clean-energy economy. RCL graduates have founded two successful companies and find jobs in both the private sector and government including:

- Go Sustainable Energy, Columbus, OH
- Energize Engineering, Lima OH
- Heapy Corporation - Dayton, OH
- Energy Optimizers - Dayton, OH.
- ICH International - Washington, DC.
- Elara Engineering - Chicago, Illinois.
- The Clean Energy Coalition - Ypsilanti, Michigan.
- Cascade Energy, Portland, Oregon.
- Grumman-Butkus, Chicago, Illinois
- Oakridge National Laboratories, Oakridge Tennessee
- American Council for an Energy Efficient Economy, Washington, DC.
- City of Alexandria, Alexandria, Virginia

### **The University of Dayton**

The University of Dayton is comprehensive teaching and research university founded in 1850. It is home to about 7,500 undergraduate students and 3,500 graduate students. The University of Dayton is ranked 99th among national universities by U.S. News and World Reports (2011).

The RCL program is part of the School of Engineering at the University of Dayton. The School of Engineering was founded in 1911 and is home to about 1,400 undergraduate students, 360 graduate

students and 84 full time faculty. The University of Dayton School of Engineering graduate program is ranked 52 in the nation by U.S. News and World Reports (2011).

The University of Dayton has strong support for international students. U.D. is ranked first in the world in international student satisfaction, according to the International Student Barometer.

### **Dayton, Ohio**

Dayton, Ohio is a very livable community in the upper Midwest of the United States. The greater Dayton area is home to 841,000 people. Dayton supports an art museum, the Air Force Museum, a strong performing arts community, the Dayton Dragon professional baseball team, and several Metro-parks connected by an excellent array of bike paths. The average temperature during January is 25 F (- 4 C) and the average temperature during July is 75 F (24 C). The region receives about 40 inches of precipitation per year. Dayton was rated

### **Admission Requirements**

If you are seeking admission to any of the masters programs in Renewable and Clean Energy, you must have an undergraduate degree from an accredited program in engineering, physics, applied mathematics or other appropriate program of study. If you have a different undergraduate degree, you may be required to complete prerequisite courses. You should have at least a 3.0 cumulative grade point average (GPA) on a 4.0 scale for admission in to this program. You should submit the following information in addition to the online application:

- An official academic record of all previously attended colleges or universities, which must be submitted directly from the colleges or universities to the Office of Graduate Admission Processing. Hand-carried transcripts, official copies marked *Issued to Student* and unofficial copies are not acceptable.
- Three letters of recommendation from professors or employers.
- A personal statement or résumé.
- Results from the GRE are not required. However, you are welcome to submit a score in support of your application.

### **Applying to UD**

To be considered for graduate admission, apply online at:

**<http://gradadmission.udayton.edu/application/>**

It's simple, fast and free. After submitting your application, check your status online ([http://gradadmission.udayton.edu/application/adm\\_status.asp](http://gradadmission.udayton.edu/application/adm_status.asp)) at any point during the process to see what pieces of information, if any, you may need to submit to UD. Enhance your experience by personalizing our Web site to view information about your academic interests, learn more about faculty and research opportunities, and receive important news and updates throughout the admission process.

The UD Guide (<http://gradadmission.udayton.edu/guide/>) provides key information for graduate students covering topics such as housing and dining, parking, computer accounts, class registration, financial services and more.

### **Cost**

The charges listed below are for the 2011-12 academic year. Visit <http://gradadmission.udayton.edu/afford/costs.asp> for more information.

Engineering (Master's)	\$758 per credit hr.
Engineering (Ph.D.)	\$862 per credit hr.

### **Financial Aid**

Teaching and research assistantships are available through the Department. The majority of our full-time graduate students receive a teaching or research assistantship, which can provide tuition plus a stipend. To applying for an assistantship, indicate your interest for an assistantship on the online admission application.

Loans and grants are also available through the University of Dayton. You must be admitted to the University of Dayton to receive a formal financial aid award. For loan and grant consideration, you are required to submit the Free Application for Federal Student Aid (FAFSA), available from any college or the Web (<http://www.fafsa.ed.gov>). Submit this form to the processing agency, and list the University of Dayton (CODE #003127) to receive the aid. Although financial aid information is processed throughout the year for graduate students, May 1 is the priority consideration deadline. It is recommended that you submit your completed FAFSA to the processing agency by May 1 for financial aid consideration for the upcoming fall, winter and summer semesters.

### **Faculty**

Our dedicated faculty will mentor your progress as you develop your research and professional capabilities. Our faculty is nationally recognized for their academic, research and service contributions in their respective areas of emphasis. Graduate faculty include:

- Dr. Kelly Kissock (Chair): Energy efficiency and solar energy
- Dr. Kevin Hallinan: Energy informatics, community energy efficiency
- Dr. Jun-ki Choi: Sustainable manufacturing
- Dr. Robert Gilbert: Renewable energy and energy efficiency
- Dr. Andrew Chiasson: Ground source heat pumps and solar regeneration
- Dr. Bob Brecha: Sustainable energy systems and environmental physics
- Dr. Sukh Sidhu: Bio-fuels and combustion
- Dr. Amy Ciric: Bio-fuels
- Dr. Binod Kumar: Fuel cells and batteries