Renewable Energy and Climate Change Education

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Introduction

In order to address the challenges in the infusion of climate change science into high school and community college renewable energy course offerings, this study focused on administrators and faculty of community colleges and high schools.

SEET Conference Participant Mini-Wind Projects

SEET Conference Participants during Presentation

SEET Conference Participants

Nineteen community college and four high school instructors in a Sustainable Energy Education Training (S.E.E.T.) workshop were interviewed regarding the challenges of designing courses that include climate change. The interviews addressed barriers and opportunities for effective integration of climate change as a dimension of any energy curriculum and the need for renewable energy as a solution and potentially important part of a world energy portfolio.

Background

Through studies evaluating trends in greenhouse gasses, weather, climate and ecosystems, there is evidence that climate change is becoming more of a problem as time continues.

Evidence:

▪Worldwide emissions of carbon dioxide increased by 31 percent from 1990 to 2005 and levels of greenhouse gasses are higher than in the previous thousands of years.

▪In apparent correlation, average temperatures within the lower 48 states have risen since 1901 with an increased rate of warming in the past 30 years and from 2000-2009 the warmest decade worldwide was recorded.

▪Temperature changes especially affect weather systems, droughts and agriculture. The last decade has seen more intense storms then previously seen.

Possible Solution:

▪The energy sector accounts for most of the greenhouse gas emissions.

▪Greenhouse gas production may be slowed by renewable energy systems that have less emissions and environmental affects. This includes solar, wind, geothermal, biomass, and hydrogen/fuel cell technology.

Wind Turbine at NREL wind site.

References:

1). The Environmental Protection Agency Report on Climate Change Indicators in the United States (2010). http://www.epa.gov/climatechange/indicators/pdfs/ClimateIndicators_full.pdf 2010.

2). US Department of Energy: Energy Efficiency Renewable Energy (2011, August 4th) http://www.eere.energy.gov/

3). CLEAN – Climate Literacy and Energy Awareness Network, (2011, July 11th) Retrieved from http://cleanet.org/

4) Feinberg, Jonathon (2009. Retrieved from http://www.wordle.net

Results

Barriers and Sustainability:

▪Challenge of incorporating climate change when community disagrees with it, common ground was found however when talking about sustainability instead. Sustainability discussions supported in the business courses as well as in technical education.

▪Quality information about CC is difficult to find and having that information geared to students is even harder. Most information too scientific to take straight into a classroom at a high school or community college level.

How Climate Change is Taught:

▪Easier to cover in a high school setting than in community colleges. Community college courses are often short on time to cover materials but it's hard to find level appropriate material for high school courses.

▪Taught for mainly general knowledge. It's considered basic background for renewable energy fields and why renewables are being used.

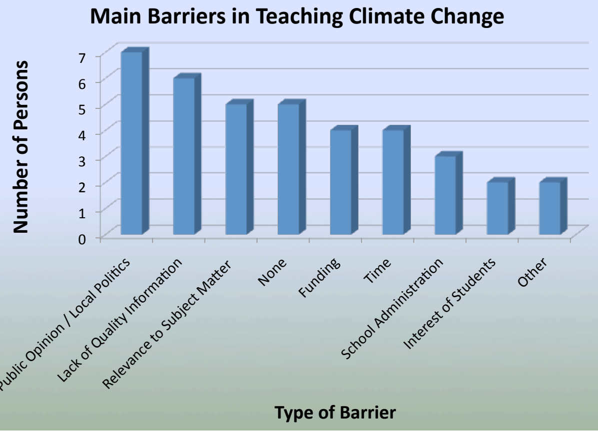
Teaching Strategies:

▪Teachers found that key words like "green" are useful in maintaining and gaining student /community interest or harmful depending on the climate change politics in the area. Most teachers found climate change an easier topic to teach when doing collaborative work with other schools or departments.

Industry / Engineered Systems:

▪Teachers are using climate change to highlight need for advanced planning of projects. For example, thoroughly thinking out the efficiencies of that system over time, and being more aware of how / what you are building and for what purpose.

Wordle – a word map showing the words that were said the most during interviews, the bigger the word the more it was mentioned..



Conclusion

When incorporating climate change in renewable energy courses in high schools and community colleges, the most problematic barriers are lack of quality information and community support. As a dimension of engineered systems and energy courses, climate change is best utilized as an introductory topic with practical examples that can be used thematically throughout the course. Involving industry sustainability practices and economics into technician courses and encouraging climate change science to be incorporated further into high school and electives was found to be the most effective solution in incorporating climate change into courses.