

Proposed Alternative Energy Certification Program at Florida Atlantic University

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ABSTRACT

The primary goal of the proposed certificate program is to address the need for “green” workforce development related to education, training, and public information dissemination of renewable energy and sustainability. The proposed certificate program incorporates the significant research and teaching experience of faculty members at the College of Engineering and Computer Science in Florida Atlantic University (FAU) to address the industrial needs in this field. An innovative curriculum is designed that includes exposure to all forms of renewable energy including solar, wind, fuel cell, bio-fuels, geothermal, and other clean-energy-related technologies as well as the underlying foundations of sustainable design and implementation of sustainable development initiatives. The proposed certificate program also incorporates content related to complex environmental, social, and economic issues relative to energy and environmental policy, including carbon reduction targets. The impact of human activity on the environment is covered in one of the courses in the program.

1. INTRODUCTION

The population of the United States is projected to increase from the current level of 303 million to 438 million by the year 2050[1]. The Department of Energy (DOE) data confirms that currently 59% of oil consumed in the US is imported as compared to 37% imported at the time of the 1973 oil crisis [2]. Only 0.2 % of all energy consumed comes from solar and wind generation, and only 3.3% is derived from bio-fuels and biomass [3].

The reliance on imported oil is a major factor in the overall security of the US, and has wide-ranging implications for economic and national security interests of the nation. In addition, the overwhelming evidences that carbon emissions play a role in global

warming, and the need to reduce the use of fossil fuels is gaining support at the national level.

According to a study by Management Information Services Inc., a Washington, D.C., research firm that has been tracking green jobs for two decades, the new industries of environmental management and protection have created 5.3 million jobs in the United States [3]. In the past, environmental jobs were mostly about regulatory compliance; now, they are supporting a wide variety of initiatives, including sustainability, water processing, and alternative energies. By 2020, "green employment" will reach a whopping 6.9 million jobs [4].

The technical and scientific challenges to provide reliable and renewable sources of energy for an additional 70 million Americans in a short 30-year period are enormous, especially so when combined with the strategic and economic concerns mentioned above. It is clear that as part of the mix of energy sources necessary to deal with these challenges, alternative energy sources will play a critical or even a central role to address the demand. The US Department of Energy, as well as a number of the national laboratories and academic institutions, has been aware of the importance of alternative energy sources for some time. Recently, the energy industry, car manufacturers, transportation experts, and even utilities are paying attention to alternative and sustainable sources of energy for the future. The universities need to play an even more important role in addressing not only the research component of the transition from fossil fuels to sustainable sources of energy, but the educational aspects and green workforce development as well. This role includes a wide range of tasks that include general public education requirements at one end of the spectrum to specific recruitment, mentoring, and retention of highly qualified students at the other end of the spectrum.

The development of the proposed certificate program will address the educational, training, and to some extent, the information dissemination components related to alternative energy and sustainability.

2. PROGRAM SIGNIFICANCE

According to the latest U.S. Census Bureau report [5], Florida has 18 million residents (number reported as of 2006). In terms of workforce development, South and Central Florida regions encompass more than 60% of the population of the entire State⁵ (approximately 5.5 million residents in the tri-counties in South Florida).

According to the recent Greenforce Florida report⁶, sales in the green industries including energy suppliers and consumer-products makers are expected to climb to \$496 billion in 2020. This growth will definitely be accompanied by a growth in the job market. In the other hand, Florida has committed to reducing greenhouse gases emissions, increasing energy efficiency and removing market barriers to renewable energy technologies. In fact, Florida is positioned to become a national leader in solar energy use after State of California. The 2009 Alternate Energy (AE) Workforce Profile published by Greenforce Florida⁶ drew several conclusions:

- *Alternative Energy (AE) educational programs are limited in Florida;*
- *Florida should fast track the creation of AE career pathways;*
- *Institutions should work together in concert with existing workforce development entities;*
- *Florida industries surveyed anticipate expansions in their areas by 2010;*
- *Shortages are expected in installation, maintenance, and repair.*

According to the recent Greenforce Florida report, educational programs and curriculum in alternative energy technology are limited throughout Florida and the United States [6]. The certificate program as proposed is the initial step for the possible development of a full master program in Florida to realize its potential as a leader in alternative energy education related to advanced green workforce work development.

PROPOSED CURRICULUM

The design curriculum for the program aims to prepare students to live in a world where the complex issues of alternative energy, environmental quality, environmental justice, and sustainability are paramount. In addition, the integration of economy and business complexity into curriculum is critical component for “green” workforce development. Given the research strengths of FAU in a several areas related to renewable energy, as well as, exiting academic constraints, a hybrid and innovation curriculum to have been developed including a Sustainability leadership from the College of Education.

In addition to four technical courses in the area of power system, the proposed FAU certificate will integrate complex environmental, social, and economic issues relative to energy and environmental policy, including carbon reduction targets. The certificate consists of four (out of 5) of the following courses dependent upon the particular need of the participants:

- *Engineering, Sustainability and Green Leadership*
- *Introduction to Alternative Energy Technologies*
- *Solar Energy and Smart Grid*
- *Renewable Distributed Generation & Energy Storage*
- *Cyber Security for Smart Grid*

REFERENCES

- [1] Population Reference Bureau (PRF) Website: <http://www.prb.org/Articles/2008/pewprojections.aspx>
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- [3]U.S. Department of Energy Solar Energy Technologies Program: (<http://www1.eere.energy.gov/solar>)
- [4]The Political Economy Research Institute (University of Massachusetts) “Job Opportunities for the Green Economy: A State-by-State Picture of Occupations that Gain from Green Investment”, June 2008.
- [5]U.S. Census Bureau (2006 statistics) website: <http://quickfacts.census.gov/qfd/states/12/12086.html>

[6]Green force Florida – Alternative Energy Workforce Profile, January 2009.

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