Introduction to Green Jobs

Creating a Pipeline from Secondary to Post-Secondary Education & Training in New Mexico's Green Economy

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Curriculum is available on-line at www.gilaresources.info/greenjobs

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INTRODUCTION TO GREEN JOBS CURRICULUM: Creating a Pipeline from Secondary to Post-Secondary Education and Training in New Mexico's Green Economy

Introduction

The emerging green economy represents a tremendous opportunity for economic development and job creation in New Mexico. The clean energy and clean-tech sectors represent some of the fastest growing industries in the nation.[i] Over the past ten years, New Mexico's clean energy sector grew by 118 percent, energy efficiency by 184 percent, environmentally friendly production by 99 percent, and conservation and pollution mitigation by 35 percent.[ii] Given New Mexico's significant renewable energy resources, range of incentives and progressive laws, the state is well positioned to experience significant job growth in a number of green industry sectors. The American Solar Energy Association estimates that 237,000 new jobs could be created in New Mexico in the renewable energy and energy efficiency sectors by 2020.[iii] How do we develop a well-trained workforce to meet future demand for these jobs, many of which are new and emerging?

Building capacity for green jobs workforce education and training is a prerequisite for development of a green economy in New Mexico. The New Mexico Green Jobs Cabinet Report specifically identifies "the development of new curricula, educational and training programs, and communication of those programs between secondary and postsecondary education, and industry"[iv] as a need in the state. Providing pathways from high school through apprenticeships and post-secondary education ensures a continuum of education and training opportunities.

The new green economy has the potential to provide low-income workers with high-quality, middle-skill jobs, yet " unless strong action is taken, clean energy jobs will remain largely out of the reach of low-skilled, low-income adults in dire need of work and better wages," according to The Working Poor Families Project.[v] Governor Richardson's Climate Change Task Force has stated that low-income communities and communities of color are particularly vulnerable to the impacts of climate change. Low-income workers in New Mexico face specific workforce training challenges identified by the Department of Workforce Solutions, such as work readiness and basic skills (e.g., literacy) and other barriers to employment (e.g., childcare, transportation). Some of the specific barriers for low-income workers in the green economy include lack of access to skills development opportunities, such as green jobs training and apprenticeship programs.[vi] Green workforce development in communities with social and environmental justice concerns is critical to ensuring that all New Mexicans are well prepared for green jobs and that local capacity is developed for climate change mitigation and adaptation.

The "Intro to Green Jobs" Curriculum Provides a Collaborative Structure for Green Jobs Training

With funding from the U.S. Environmental Protection Agency Environmental Justice Small Grants Program, this curriculum was developed to build capacity for green jobs training and education for high school students in environmental justice communities in New Mexico that will equip students with the knowledge, skills and abilities to compete for employment in the growing green jobs sector. The curriculum proposes to achieve this goal through creation of a collaborative structure that will support and guide transition from high school to post-secondary training for green jobs for low-income students in New Mexico. The curriculum improves access to skills development opportunities in green jobs and overall will strengthen the education pipeline to green careers.

Curriculum development has followed a multi-disciplinary approach by synthesizing input and expertise from a Curriculum Advisory Committee comprised of green businesses, economic development, public education and workforce development experts, along with secondary and post-secondary school educators. The curriculum has integrated the latest green job projections and employer needs in New Mexico with standards-based curricula and training and educational resources for green job career pathways. Career guidance and mentoring are also incorporated into the curriculum program.

Curriculum Overview

The Intro to Green Jobs curriculum follows career cluster and industry sector frameworks outlined in the Higher Education Department's New Mexico Career Cluster Guidebook[vii] and Economic Development Department's New Mexico Green Jobs Guidebook,[viii] respectively. Clusters are geographically concentrated groups of interconnected companies, universities, and related institutions that arise out of linkages or externalities across industries.[ix] Clusters provide a framework to directly link education and training to economic development.

New Mexico has adopted seven career clusters to align educational efforts with employer needs in the state. Green jobs fall primarily into four of these clusters.[x] ***This curriculum addresses green jobs in the Engineering, Construction and Manufacturing and Energy and Environmental Technologies clusters***.

1. <u>Engineering, Construction, and Manufacturing</u>
• Building energy efficiency and green building
• Clean technology manufacturing
• Environmental and energy efficiency design and analysis

2. <u>Energy and Environmental Technologies</u>
• Renewable energy generation

• Biofuels research, development, and production
• Biogas producers
• Smart grid / green grid
• Recycling and reuse
• Efficient fossil-fuels technology and carbon capture and sequestration
• Air and water quality
• Low carbon transportation

3. Hospitality and Tourism
• Ecotourism

4. Business Services
• Green sales and marketing
• Environmental education and training

The curriculum is organized according to five units. The materials developed meet New Mexico Standards and Benchmarks in STEM, social studies, and career readiness. Career pathways, a technical or career training framework in which students follow a sequential program of study from basic through progressively more advanced learning, are provided for jobs in each green industry sector (e.g., solar, biofuels, wind energy). Job outlook data, job training and education, and career exploration and planning resources are also incorporated into the curriculum.

Piloting of Curriculum

This draft curriculum was piloted spring semester 2011 at Aldo Leopold High School in Silver City. Pre- and post-course evaluations were given to students to measure outcomes of the course as a whole (see Evaluation below). Evaluations of content, activities, field trips and guest speakers were administered at the end of each session to teachers, guest speakers, and students in order to gauge the effectiveness of curriculum materials and elements and identify areas for improvement.

Curriculum Elements Tested

Alternative methods were tested during the semester for providing:

- Career and post-secondary education/training guidance
- Guidance re: dual credit courses for specific green jobs
- Mentoring of students by local green businesspersons
- Green jobs internships for providing students with on-the-job training with local green businesses

Evaluation

Curriculum evaluation measured the following outcomes:

- Increase in number of students aware of climate change impacts, mitigation and adaptation strategies, and green jobs opportunities in NM as a result of the course.
- Increase in number of high school students that pursue dual credit or internship programs related to green jobs.
- Increase in number of high school students that pursue post-secondary school education or training in the green economy.

Dissemination of Curriculum to New Mexico High Schools

After piloting of the curriculum in spring 2011, feedback from class evaluations and the Curriculum Advisory Committee were incorporated into the curriculum. The curriculum was presented to teachers and administrators across the state in June 2011 at the New Mexico Association of Career Technical Education.

Partners

We would like to acknowledge the contribution of our project partners: Aldo Leopold High School, New Mexico Department of Workforce Solutions, New Mexico Economic Development Department, New Mexico Public Education Department, Western New Mexico University Applied Technology Program, Southwest Chapter of the New Mexico Green Chamber of Commerce, and Silver City/Grant County Office of Sustainability.

Special thanks to Curriculum Developer, Debaura James of Aldo Leopold High School and our Curriculum Advisory Committee for their input and assistance.

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Components of Curriculum

I. Content

This course is designed to familiarize high school students with potential career pathways in the green job sector in New Mexico. The state of New Mexico defines green jobs as "family-supporting, career track jobs that directly contribute to preserving or enhancing environmental quality." Green jobs can be found in green industries such as renewable energy, but also in a range of industries. Any job that has a substantial focus on environmental quality or energy and resource efficiency is a green job.[xi]

Using local experts and practitioners, a certified teacher will moderate and facilitate the semester-long course introducing high school students to potential job opportunities, some of the necessary skill-sets, and information on post-high school training in each of these fields.

The course will begin with an introductory period familiarizing students with environmental literacy, environmental justice, and sustainability. In addition, students will be introduced to workplace readiness skills and employment information. Organized into one introductory unit and 6 thematic units, occupations in a number of green economy sectors that require on-the-job or certification training will be explored by students. The thematic units can be placed on your schedule in the order you choose, based on the availability of the experts in the field you are inviting into your classroom. The Career Goals and Assessment Unit should be the capstone unit at the end of the course.

The units are organized as follows:

Introductory Unit: Climate Change, Peak Everything, Sustainability and Your Job in the Green Economy
Unit A: The Grid and Electricity Production with Renewable Energy
Unit B: Green Building, Energy Efficiency, and Environmental Protection
Unit C: Water Conservation, Water Quality, and Stormwater Management
Unit D: Sustainable Agriculture and Biomass Energy
Unit E: Transportation Fuels and Alternative Transportation
Unit F: Clean Manufacturing, Waste Management and Recycling
Career Goals and Assessment

Each unit is organized to:

- introduce the environmental, social, and economic implications of green technologies
- introduce the basic applied science involved in the green technologies (including at least one laboratory experience)
- provide a survey of the types of jobs available in that green economy sector, the New Mexico colleges that provide certification training, and how to get funding for those programs.
- provide a hands-on experience in an aspect of the green technology which will in some cases involve a field trip.
- Each unit will conclude with an assessment of achievement in which the student must score a 70% or better.

The culmination of the course will be spent focusing on goal-setting and creating a personal career plan.

II. Outcomes and Objectives for the Course

The student will:

- Recognize the case for and components of a green economy
- Identify the key skill-sets necessary for a variety of jobs in each green career cluster
- Demonstrate basic understanding of the applied science behind alternative energy production, capture, and utilization.
- Recognize and practice clean and safe working habits, consistent with trade practices following OSHA standards.
- Communicate, analyze, and solve problems related to an industrial trade environment.
- Demonstrate teamwork.
- Exhibit a good work ethic.
- Identify realistic career interests for his or her future pursuit
- Identify certification training programs for a variety of green jobs
- Create a personal SMART (specific, measurable, attainable, realistic, and timely) green-job career goal

III. NM State Standards and Benchmarks

Career Readiness

Content Standard 1: Students will identify their career interests and aptitudes to develop an educational plan which supports personal career goals.

Content Standard 2: Students will utilize and manage resources effectively to produce quality services and products.

Content Standard 3: Students will demonstrate the technological knowledge and skills required for future careers.

Content Standard 4: Students will develop and demonstrate responsible and ethical workplace behaviors.

Content Standard 5: Students will develop effective leadership, interpersonal, and team skills.

Science:

Content Standard 1 (Physical Science): Understand the structure and properties of matter, the characteristics of energy, and the interactions between matter and energy.

Content Standard 3 (Science and Society): Understand how scientific discoveries, inventions, practices, and knowledge influence, and are influenced by individuals and societies.

Social Studies:

Content Standard 2 (Geography): Students understand how physical, natural, and cultural processes influence where people live, the ways in which people live and how societies interact with one another and their environments.

Content Standard 4 (Economics): Students understand basic economic principles and use economic reasoning skills to analyze the impact of economic systems (including the market economy) on individuals, families, businesses, communities, and governments.

Mathematics*:*

Strand: Data Analysis and Probability: Students will understand how to formulate questions, analyze data, and determine probabilities

IV. Skills and Body of Knowledge

Students will learn the science and social studies concepts of:

- global climate change
- peak oil/peak everything
- sustainability
- environmental justice
- how the electrical grid works
- management of limited energy resources
- the environmental, social and economic impacts of pollution
- responsible use of renewable energy resources

Students will learn the applied science associated with:

- Photo-voltaics
- Basic mechanics
- Wind power generation
- Bio-fuel production
- Water conservation
- Energy-efficiency in building construction
- Lead abatement and indoor air quality
- Sustainable agriculture
- Clean manufacturing and waste management

Students will obtain skills that will help them to:

- Wisely choose a career path and set realistic goals for achievement
- Compete for the best jobs
- Be sought-after employees
- Develop their personal leadership qualities balanced with their ability to be a team-player

V. Essential Questions

- What constitutes a green economy?
- What careers are emerging in the effort to reduce our dependence on fossil fuels, to reduce the advance of rapid climate change, and to make responsible use of our natural resources?
- What career-paths interest me and suit my talents?
- What are the skill-sets needed to be successful in the workplace?
- How and where can I learn the necessary skills to land a good green job in a field that interests me?
- What strategies can I use to pursue a green job that suits me?

VI. Integration

This course will build upon information obtained in previous social studies, language arts, mathematics, and science classes. It will continuously draw on skills in each of these disciplines.

VII. Assignments/ Opportunities to Learn

Students will keep an on-going journal each day of the class. Five minutes will be set aside at the end of each class to make journal entries, in which the student records his/her impressions of the technology or the possible careers being discussed. This will be where the student records his or her preferences and notations on their own aptitudes.

This format is recommended for this course:

Week 1: Introduction to the concepts of environmental literacy, environmental justice, sustainability

Week 2: Introduction to workplace readiness and basic employment practices.

Week 3-15: Six thematic units.

Each unit will follow the following format:

1. Implications of the technology discussed (environmental, social, economic)

2. Applied science involved in the technology (conceptual and lab)
3. Employment prospects
4. Training programs that prepare workers for specific career pathways
5. Expected course of study in training programs
6. Experiential component/direct experience

Weeks 16: Reviewing training programs, funding sources for training, and completing the Free Application for Federal Student Aid (FAFSA)

Week 17: Goal-setting and career planning

Week 18: Final assessment.

VII. Student Expectation

Each student is expected to be prepared for class by being in his or her assigned seat at the designated time, ready for class. Each student is expected to come to class with the required materials and homework complete each day. Personal needs should be attended to prior to class. The essential requirement in the classroom and in the field is mutual and self respect, teamwork (able to demonstrate leadership as well as to work as a member of the team), including respect for others and their ideas, their abilities, and their property, and one's self. All school rules are to be upheld in the classroom.

VIII. Assessment

Students will demonstrate their mastery of the concepts in a variety of ways including:

- traditional exams
- quizzes
- dialogues/participation in classroom discussions
- hands-on projects and demonstration of skills
- class work
- homework
- note-taking
- goal-setting
- career planning

Each grading period will be based on exam scores, homework, labs, projects, quizzes, attitude, participation and behavior—each carrying approximately the same weight. The following grading scale will apply for each quarter and semester grade: 90-100% = A, 80-89% = B, 70-79% = C, <70%=F.

IX. Modifications to Instruction:

- Help from an Educational Assistant for assignments.
- Use of computer for word processing, spell check, grammar check, etc.
- Extended time for assignments.
- Oral, informal quizzes to check for comprehension.
- Written quizzes (e.g. for vocabulary) can be given via graphical or pictorial formats.
- Use of artwork to express ideas in addition to written formats.
- Use of manipulatives to augment periods of direct instruction.
- Work with partners in small groups.
- Frequent feedback.
- Credit given for oral participation.
- Teaching to a variety of learning styles and intelligences.

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[i] "Clean Energy Economy: Repowering jobs, Businesses and Investments Across America. The Pew Chari table Trusts. June 2009. http://www.pewcenteronthestates.org/uploadedFiles/Clean_Economy_Report_Web.pdf The Pew Charitable Trusts found that clean energy jobs grew by 9.1 percent between 1998 and 2007, while the total US labor market increased by only 3.7 percent during that time period.

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[v] David Altstadt, The Working Poor Families Project, "A Pathway to Clean Jobs and Prosperity: State Policies For Helping Low-income Working Families Build Clean Energy Careers." Spring 2010.
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