

What's Old is New

Green Jobs & What America's Federal Workforce Investment System Can Do *Now* to Develop a *Green* Workforce

An Article for Federal Workforce Investment Policymakers & Practitioners

by Robert T. Mejia

January 14, 2009

Acknowledgements

Technical Editors

Bonnie Graybill, Deputy Chief
Program and Local Information Section
Labor Market Information Division
California Employment Development Department

Brad Kemp
Beacon Economics
Director of Regional Research

Tony Pereira, MSME, EIT
UCLA ME, PhD Candidate
MCL Lab Manager

Lance A. Williams, PhD
LEED® Accredited Professional
Executive Director
U. S. Green Building Council-Los Angeles Chapter

Copyright © 2009 Robert T. Mejia

All rights reserved. No part of this information may be stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the written permission of the publisher.

Contents

EXECUTIVE SUMMARY	1
Introduction	3
The Ticking Environmental Clock	4
We Must Act – But How?	4
Defining a Job	5
Defining a Job Based on Perspective or Context	6
Approaching Green Workforce Development	7
Green Root Occupations	7
Green Derivative Occupations	8
Green Root Skill Sets	9
Guiding Principles for Green Jobs	10
Applied Definition of a Green Job	10
Outcomes-Based Criteria for Green Jobs	11
Green Evaluation Criteria for Service Occupations	13
Green Jobs Advisory Panels	14
Green Employer Certification	15
It’s Easy Being Greener	16
Green & The Knowledge Workforce	16
Standards-Based Criteria for Local Green Jobs Education & Training	18
A Bit of Local Workforce Investment History	18
What America’s Federal Workforce Investment System Can Do <i>Now</i> to Develop a Green Workforce	20
RECOMMENDATIONS	21
Federal & State Labor Market Information Systems	21
Federally Funded Local Workforce Development Entities	21
Summer Youth Employment & Training Program Funders & Operators	23
Other Recommendations for the Federal Workforce Investment System	24
About California’s GREEN Workforce Coalition	24
Conclusion	25
About the Author	26

Executive Summary

Global warming, its immediate affects on the planet, and its long-term affects on the life-supporting systems upon which all of Earth's inhabitants depend, is creating a sense of urgency, and momentum to take action around the world. U.S. leadership and involvement will largely determine whether responses by the world community will be effective in defeating the greatest threat mankind has ever faced. Collectively, we must move to more intelligent forms of design, production, consumption, and disposal that provide value and equity for all people while preserving the sanctity of the environment and the Earth's ability to renew itself to sustain future generations.

A transformation of economic systems is underway that will fundamentally change the way we treat our planet and all it has to offer. At the core of this transformation is a shift to the use of clean and renewable energies that, in their development and use, will create and sustain millions of new economic opportunities for businesses and workers worldwide.

Victory will require new energy systems, environmental technologies, and ways of thinking buttressed by profound and unswerving investments in all aspects of the workforce. Such investments should begin immediately and be guided by sound economic and labor market intelligence to assure that innovation and opportunity meet to provide all workers a place in the new economy.

Around the country, public institutions are eager to launch new efforts to prepare and develop a workforce with the knowledge, skills and abilities to fuel essential economic transformation. What has given these institutions pause, however, is a lack of clarity in the definition, purpose and location of *green jobs* caused, in part, by anachronistic methods of describing economic activity and labor market conditions. Therefore, changes must occur in the way we approach occupations and business activities in order to appropriately characterize and evaluate environmentally sustainable functions, activities, and outputs that are both well intentioned and measurable. Until such changes occur, there are interim measures the federal workforce investment system can take to implement what has become a national imperative against global warming: creation of a *green* workforce fully engaged in the useful and environmentally sustainable transformation of space, energy, effort, information, ideas, and knowledge, resulting in value.

To this end, the following strategies are recommended for what America's federal workforce investment system can do *now* to develop *green jobs* for a sustainable future.

To Federal & State Labor Market Information Systems:

- Expand national occupational data collection systems to recognize and track *green* industry activities and occupations; make refinements based on qualitative input from employers and provide relevant information to specific geographies.
- Promote recognition and incentive systems for exemplary *green* employers.

To Federally Funded Local Workforce Development Entities:

- Establish standards-based *Green Demand Occupations Lists* for use by local stakeholders.
- Adopt *Guiding Principles for Green Jobs*.

- Adopt *Outcomes-Based Criteria* for *Green Jobs*.
- Provide *green-focused Employer Services*.
- Adopt *Green Evaluation Criteria for Service Occupations*.
- Establish *Green Jobs Advisory Panels* to evaluate training opportunities and projects.
- Develop and implement *Green Employer Certification* systems.
- Establish *Green Education and Training Provider Directories* based on guiding principles for *green jobs* and specific, industry-recognized criteria.
- Provide apprenticeship preparation services in collaboration with organized labor as needed.
- Seat *green* experts from the public and private sectors on local workforce investment boards.
- Promote recognition and incentive systems for exemplary *green* employers.

To Summer Youth Employment & Training Program Funders & Operators:

- Collaborate with public and community-based agencies to develop summer opportunities that provide youth exposure to and experience in sustainability-oriented education, employment, and community-service activities, and tie such opportunities to year-round programming.
- Facilitate access to and connections with secondary and post-secondary education programs that focus on sustainability and pathways to *green* careers.
- Facilitate private sector labor market opportunities with *green* employers that offer job-bound youth upward mobility and livable wage potential; this includes preparation for licensed apprenticeship programs leading to *green* work opportunities in the skilled trades.

Other Recommendations for the Federal Workforce Investment System:

- Fund training/education for incumbent workers and job-seekers who have a desire and propensity to work in *green* science, technology, engineering and mathematics (STEM)-oriented careers. Exclude participants from federal *Common Measures* requirements.
- Provide incentives for currently undeclared associate, bachelor's, and advanced degree aspirants to focus their trajectories into *green* STEM fields and careers.
- Promote a national campaign to encourage and enable opportunities for *green* STEM education and careers in environmental technology fields.
- Fund public sector and community-based activities designed to provide career and academic support to high school and college-bound youth who plan to pursue a *green* STEM career.

The pages that follow provide further discussion upon which these recommendations are based. It is my hope that you find the perspectives contained within helpful, and that some of the ideas suggested could serve as a platform for what *you can do now* to assure a sustainable future.

A Green Workforce: Two or more engaged in the useful and environmentally sustainable transformation of space, energy, effort, information, ideas, or knowledge, resulting in value.

Introduction

Although the U.S represents only 4 percent of the world's population, [it is] responsible for 25 percent of the world's greenhouse gases. In other words, one out of every four carbon molecules superheating the atmosphere has our name on it.¹ Although California is only one of fifty states, the state represents the world's 8th largest economy.² Approximately 1.2 of every 10 U.S. citizens resides in California³ and 1.2⁴ of every 10 civilian labor force participants (12% of the U.S. total) works here.⁵ With progressive climate change legislation already enacted, its formidable industrial capacity, the sheer size of its workforce, and its ability to lead by example, as it did in the 1970s, California may be at the epicenter of the national battle to defeat the climate crisis challenge.

In December 2007, President George W. Bush signed into law the *Energy Independence Act of 2007* (also referred to as the 2007 Energy Bill), which included the *Green Jobs Act of 2007* (PL110-140 or "the Act"). The Act is forward-looking workforce-environmental legislation sponsored by California Congresswoman Hilda L. Solis (D), President-Elect Barack Obama's selection for U.S. Secretary of Labor. The Act, which amends the *Workforce Investment Act of 1998 (WIA)*, establishes a federal energy efficiency and renewable energy worker training program, and authorizes \$125 million in funding as an initial investment in the development of America's *green* workforce.

This article does not discuss the employment potential of the *green* economy, nor does it point to specific industries and occupations as the most likely affected by *green* activity. I believe all occupations in all industries have the potential to be *green*. Its purpose is to advise federal policymakers and practitioners in California and other parts of the U.S. who are charged with *green* workforce development at the local level. It suggests concepts and provides perspectives that are based on my review of a number of *green jobs* and *green* economy reports, personal observations and experiences, conversations with post-secondary education representatives, environmentally conscious business owners and other sustainability experts, and an examination of the federal labor market information and North American Industry Classification systems.

The goal of this article is to help those charged with the practical aspects of developing a *green* workforce understand certain implications of *green jobs* training and placement activities by providing discussion, perspectives, and suggestions for their interpretation. Less time should be spent defining what a *green job* is; more time should be spent implementing solutions to what could become a protracted shortage of qualified workers for the new *green* economy in the absence of structured and systematic approaches to *green* workforce development.

Despite the scope and urgency of climate change, it is part of the larger issue of environmental degradation. Human consumption, waste, and pollution are damaging the biosphere (land, water, atmosphere, biodiversity) beyond its ability to sustain life as we know it. But, because climate change is now center stage, and because many individuals, organizations, institutions, and governments are mobilizing to address the issue head on, the bulk of this article will deal with *green jobs* from that perspective. The term *sustainability*, defined by the U.S. Environmental Protection Agency as, "*meeting the needs of the present without compromising the ability of future generations to meet their own needs,*"⁶ and the term *green*, are referred to interchangeably in this article.

The Ticking Environmental Clock

While the debate over global warming and the role of human activity within it continues, a growing body of scientific data indicates that manmade or not, the climate is in fact changing at an unnatural pace, which suggests dire, long-term consequences for humanity. In a January 2007 report, the Intergovernmental Panel on Climate Change (IPCC) stated that most of the global average warming over the past 50 years is *very likely* due to anthropogenic [caused by human activity] GHG increases and it is *likely* that there is a discernible human-induced warming averaged over each continent (except Antarctica).⁷ The American Association for the Advancement of Science,⁸ The American Geophysical Union,⁹ and the American Meteorological Society¹⁰ echo this conclusion.

We know that accelerating environmental degradation is being driven as much by world population growth as by persistent pollution and un-replenished consumption. We also know that the crescendo of this degradation is making imperative a choice between two alternatives that will decide whether our future as a civilization will entail: y) extreme weather events, increased poverty, disease, drought, flooding, shortages of natural resources, geographic dislocations, losses of biodiversity, and economic disruptions; or z) an achievable balance between human activity and the Earth's ability to sustain all species within its embrace.

We Must Act – But How?

Amidst the worst economic decline since the Great Depression of the 1930s, the incoming Obama Administration promises to re-ignite the industrial fires of the U.S. economy and to some degree, world economies, with legislative mandates and incentives, combined with large infusions of capital into *green* research and development, national infrastructure improvements, energy efficiency programs, and *green jobs* training. To be sure, the country is watching and waiting with the rest of the world to see how U.S. policies and investments concerning global warming and climate change will roll out under new leadership.

Among our many questions:

- *Where can federal workforce investments have the best immediate and long-term impacts in response to the skill needs of U.S. businesses already engaged in carbon reducing activities?*
- *Where should U.S. investments in its workforce be made to address movement by new industries and businesses toward more environment-conscious industrial processes as a result of a greater and growing understanding of the climate crisis, changing consumer preferences for green products and services, and growing concern for the environment?*

As we finally grasp the frightening possibilities associated with climate change, an instinctive reaction is to rush hurriedly to “do something, anything, right now!” Each day of inaction, foot-dragging, and tepid responses moves us closer to an unthinkable, yet increasingly likely future dictated by an enemy we cannot directly see. This time, quick fix approaches to problem-solving are not the answer. While current and planned global solutions are a good start, it will be decades before their effects can be measured or pronounced successful in defeating this seemingly inexorable foe.

At this pivotal point in human history, a dramatic shift in thinking, and in the way we conduct business is necessary. Well-constructed policies, innovative planning, and long-term collaboration are required. We must act, but how? Assuming it is not too late, where does one start, how does one plan,

and where should one focus his or her time and resources? These and other questions have given pause to workforce developers and planners around the country, particularly those in the federal workforce investment system, as well as state and local officials, and taxpayers who will insist that finite workforce investment resources allocated for *green jobs* training and employment opportunities produce their intended results.

Defining a Job

Currently, there are two excellent definitions of a *green job*. The first: A family-supporting, career-track job that directly contributes to preserving or enhancing environmental quality.¹¹ The second: Green-collar jobs are blue-collar jobs in green businesses; that is, manual labor jobs in businesses whose products and services directly improve environmental quality.¹² In meetings where the issue of *green jobs* is being discussed, people often refer to *green industries* or the *green jobs sector*. In deciding how to assess labor market information for *green jobs* training and placement opportunities, these two terms can be confusing.

The U.S. Bureau of Labor Statistics (BLS) describes an industry as:

A group of establishments that produce similar products or provide similar services. For example, all establishments that manufacture automobiles are in the same industry. A given industry, or even a particular establishment in that industry, might have employees in dozens of occupations. The North American Industry Classification System (NAICS) groups similar establishments into industries.¹³

Applying the BLS definition of an industry, all establishments producing similar *green* products or providing similar *green* services would make up the *green industry*. It would follow, then, that all of the jobs in this *green industry* comprise the *green jobs sector*. I have found, however, and I believe many labor market analysts would agree, that *green* is not currently categorized as an industry under the North American Industry Classification System, nor are labor market statistics captured and organized in a way that groups all occupations with evidence of greenness into their own category.

The California Economic Strategy Panel corroborates this finding in its 2008 draft report, "*Clean Technology and the Green Economy—Growing Products, Services, Businesses and Jobs in California's Value Network.*"

New discoveries and importantly new demand for green technologies are fueling the expansion of business activities across the entire economy to develop in greener ways, offer greener products, and provide services in helping businesses (and residents) become more resource efficient. This reality means that more often than not, green products and practices are contained in the same industry categories as conventional products and practices and thus precludes an economic analysis based primarily on tracking business and employment growth by industry code.¹⁴

Because a number of U.S. industries (for example, Energy, Utilities, Construction, Wholesale Trade and Warehousing, Public Administration, and Transportation) are moving to more sustainable activities, an increasing number of job classifications are becoming *green*. From the jobs perspective, it may be accurate to say that there are existing industries employing traditional workers in tasks whose outcomes reduce consumption, waste, and pollution while new and distinct *green* occupations are beginning to emerge.

When we refer to a job or occupation are we referring to a business opportunity for an independent contractor or entrepreneur, one's self-identified profession, or an employer-employee relationship? In describing a job a labor attorney might define it in terms of its legal aspects, which might include contractual obligations between the parties and employee rights, and have little to do with work functions, role, or industry location. Local workforce developers--policymakers, educators, administrators, trainers, career guidance counselors, case managers, job developers, economic developers, and business services representatives--must exercise caution and prudence to avoid confusion when determining whether or not a job is *green* and how *green* is being defined. Unfortunately, the definition of a job can be different in different contexts. Further, there is no universally agreed upon definition of a job, and when described by authorities, either by function and role or by tasks and location in an industry, the definition of a job is sometimes blended.

BusinessDictionary.com defines a job as:

A group of homogeneous tasks related by similarity of functions. When performed by an employee in an exchange for pay, a job consists of duties, responsibilities, and tasks that are (1) defined and specific, and (2) can be accomplished, quantified, measured, and rated. From a wider perspective, a job is synonymous with a role and includes the physical and social aspects of a work environment. Often, individuals identify themselves with their job or role (e.g., foreman, supervisor, engineer, etc.) and derive motivation from its uniqueness or usefulness.¹⁵

The *BLS Occupational Employment Statistics (OES) Program* defines an occupation as:

A set of activities or tasks that employees are paid to perform. Employees that perform essentially the same tasks are in the same occupation, whether or not they are in the same industry. Some occupations are concentrated in a few industries, while other occupations are found in the majority of industries.¹⁶

While it is helpful to understand these definitions, a strict reading does not appear to provide sufficient information to make a determination as to the greenness of a job *or* occupation.

Defining a Job Based on Perspective or Context

I may see myself as a public administrator by education, while others see me as a social entrepreneur, environmentalist, or labor market analyst based on my apparent interests and work assignments without looking at the skills I possess or their best industry location. In another example, if I were to take a position in a company as a *quality manager*, I may find that although implied in the title, there is very little to do with quality or actual management duties and authorities. I might also find that, while my job title remains the same, my next assignment will entail a very different application of my skills toward a new set of product or service objectives, objectives for which I was not originally hired. Should my job title change even though my skills remain the same? Would the job title properly identify my true function in the company? Would the additional knowledge or skills developed in a forty-hour in-service on the operation of new workplace equipment or on new work procedures be enough to change my occupational title?

In the case of *green jobs*, the potential for confusion in defining them, their corresponding skill sets, their functions, and their industry locations may result in misguided or inadequate preparation. Sustainability, and *Greenwashing* (claims of greenness when there is little to no greenness involved) must be considered. Reliable labor market information is essential to appropriate and effective planning for

programs designed to meet the skill needs of employers, particularly those in need of the skills necessary to meet new demand for *green* products and services.

It is important that workforce developers understand: 1) traditional jobs/occupations; 2) traditional jobs/occupations and skill sets employed in a more sustainable manner; 3) derivative jobs/occupations focused exclusively on *green* activities; and 4) methods to determine their differences. Accordingly, the pages that follow are intended to aid policymakers and practitioners by offering constructive perspectives and approaches.

Approaching *Green* Workforce Development

Discussed below are nine newly embraced *green jobs* concepts that derive from the work of California's *GREEN* Workforce Coalition (Coalition), which have provided focus to my own efforts as a *green* workforce systems developer and those of the South Bay Workforce Investment Board and its partners. These concepts are:

- 1) *Green* Root Occupations
- 2) *Green* Derivative Occupations
- 3) *Green* Root Skill Sets
- 4) Guiding Principles for *Green* Jobs
- 5) Applied Definition of a *Green* Job
- 6) Outcomes-Based Criteria for *Green* Jobs
- 7) *Green* Evaluation Criteria for Service Occupations
- 8) *Green* Jobs Advisory Panels
- 9) *Green* Employer Certification

Green Root Occupations (GROs)

Definition: **Green Root Occupations** are jobs/occupations requiring traditional knowledge, skills and abilities (KSAs) that can be applied to achieve sustainable product/service outcomes. Such occupations contain KSAs that are also found in derivative occupations that support sustainable activities and objectives; such derivatives may omit some root KSAs or contain added KSAs.

New developments in environmentally sustainable technologies and production methods are blurring and even redefining once traditional and well-understood occupations. However, the quest to understand *green jobs* and how to prepare workers for them may be less about reinvention and more about examining the content, deployment, and ultimately, the sustainability of existing *green* growth occupations--occupations with employer-desired skills that can be directed toward *green* outcomes.

Many of the occupations referred to as *green* have their roots in traditional occupations--take the *electrician*, for example. Until recently, there was no particular distinction in the title or definition that would classify this occupation as *green* or non-*green*--to the layperson an electrician was simply an electrician. Today, it can be argued that electricians who spend all their time using existing KSAs to install solar panels on rooftops, wire components for intelligent transportation systems, or assist in the design and manufacture of modern wind turbines are working in a *green job*. This occupational distinction is earned because the electrician's work objectives entail energy systems, transportation systems, and products associated with lower carbon emissions. The same could be said for other traditional occupations (for example, secretary, computer analyst, auditor, security guard, attorney) found

in work settings with a notable sustainability focus, such as an energy efficiency center or an environmental consulting firm.

In looking at *green jobs/occupations*, the evidence suggests that they tend to be grounded in classic occupations in terms of their origins and nature. I call these classics *Green Root Occupations (GROs)*--traditional occupations as defined above with:

- 1) Positive growth rates;
- 2) The potential for lateral and upward mobility; and
- 3) Evidence that they are evolving into *greener* versions or *derivatives* according to the sustainability objectives of their employers.

The table below contains a sample of GROs identified by several research groups.

Green Root Occupations (GROs)	SOC Code
Accountants and Auditors	13-2011
Computer Software Engineers, Applications	15-1031
Environmental Engineers	17-2081
Life Scientists	19-1000
Landscaping and Groundskeeping Workers	37-3011
Roofers	47-2181
Automotive Service Technicians & Mechanics	49-3023
Industrial Machinery Mechanics	49-9041
Power Plant Operators	51-8013
Refuse & Recyclable Material Collectors	53-7081

The blending of KSAs toward work objectives driven by climate necessities, technological advances, consumer demand, legislation, or commercial opportunity may continue to revise descriptions of electricians, secretaries, engineers and other well-known root occupations, to the extent, perhaps, that new classifications will be necessary.

Green Derivative Occupations (GDOs)

Definition: **Green Derivative Occupations** are jobs/occupations with traditional KSAs and KSAs that have been added, mixed, or eliminated to achieve sustainable product/service outcomes.

The concept of a *Green Derivative Occupation (GDO)* in no way reflects a lesser occupational status. To the contrary, GDOs appear to possess most (if not all) of the KSA attributes of their *Green Root Occupations*, and new or modified KSAs for more sustainable work activities and outcomes. For example, a *Solar Residential Installation Electrician* could be considered as occupying a GDO as it contains most, if not all, of the requisite KSAs needed by an electrician that, when combined with additional KSAs pertaining to solar technology, should result in more sustainable work-to-product/service outcomes. In essence, the occupation could be considered a robust *derivative* of its *green* root--the electrician. *Green Derivative Occupations* should not be confused with truly novel *green* occupations, that is, emerging *green* occupations and those that do not yet exist with KSA requirements and work functions substantially dissimilar from any other known occupation.

The 2008 *Green Jobs Guidebook: Employment Opportunities in the New Clean Economy*, prepared by the Environmental Defense Fund and the Oakland-based Ella Baker Center for Human Rights,

contains profiles of over 200 *green jobs*, many of which are examples of GDOs and evidence of the need for *Green Root Skill Sets* in industry. As has already begun, *green* employers, labor unions, and environmental groups are defining the meaning and content of a wide array of *green jobs* and occupations--some are derivatives, while others are new and unique, occupying their own industry niches and using skill sets increasingly defined by new technologies, materials, methods, and sustainability objectives. It is critical that federal workforce developers collaborate with these groups to verify the accuracy of their own efforts and assure that occupational education and employment activities are sound, timely, and responsive to the goals of sustainability.

Green Root Skill Sets

Definition: **Green Root Skill Sets** include the knowledge, skills and abilities for which local demand has been determined with respect to occupations needed for *green* activities.

Green Root Occupations contain skill sets needed by firms that are moving to more sustainable uses of resources by their own companies and customers, and others engaged in the research, design, development, distribution, and delivery of environmentally responsible technologies, goods, and services. I call these *Green Root Skill Sets*. In May of 2008, on behalf of California's **GREEN** Workforce Coalition, the South Bay Workforce Investment Board identified over 120 job titles (synthesized from seven separate *green jobs* reports) involved in *green* activity in U.S. industries; most of the occupations identified were individual GROs while some were essentially the same GRO with different titles. The Los Angeles Central Coast Office of the California Employment Development Department (EDD)-Labor Market Information Division analyzed the list and determined it contained 104 distinct occupations. From this list, forty-three GROs were found to have growth rates equal to or greater than the local (Los Angeles County) average and were placed on a separate demand occupations list to reflect potential *green* employment opportunities in the area. Forty-five additional occupations had positive growth, but at rates less than the county average.

Green Derivative Occupations (GDOs)	Green Root Occupations (GROs)	SOC Code
Deconstruction Worker	First-Line Supervisors of Const.	47-1011.00
	Construction Laborers	47-2061.00
Solar Sales Representative/Estimator	Sales Representative	41-4011.00
	Cost Estimator	13-1051.00
Solar Designer/Engineer	Civil Engineer	17-2051.00
	Electrical Engineer	17-2071.00
Plumber-Solar Water Heating Collectors	Plumbers and Pipe-Fitters	47-2152.01

Although it is possible that many of the GROs we identified are actually better placed in the GDO category, what was evident was that: 1) in Los Angeles County, demand exists for the skill sets associated with each irrespective of greenness; and 2) the industries in which the GROs are found are also locations of *green* activity and *green job* clusters. The table above includes a sample of the original list of 120-plus *green job* titles we identified. It reflects what are ostensibly *Green Derivative Occupations* on the left and their apparent *Green Root Occupations* to the right. Further examination is needed to define the KSA relationships between these and other *Green Root* and *Green Derivative* occupations.

It was difficult to arrive at exact KSA matches between GRO and GDO titles based on key word searches giving currency to arguments that GDOs may be as much non-*green* as *green*, and novel rather

than derivative. Combine such difficulty with the persistent evolution of work functions, technology, and employer uses of workers, skills, and job titles in varying combinations and it is quickly apparent that new labor market information and occupational assessment tools are needed to effectively identify, describe, and classify *green jobs* by industry. While state agencies like the California EDD Labor Market Information Division are working on such tools, until they are developed and made widely available, local workforce developers would be wise to use additional screening criteria and verification methods to assure the validity of *green* employment opportunities. While the concepts of *Green Root Occupations*, *Green Derivative Occupations*, and *Green Root Skill Sets* help us determine what *green jobs* are and where to find them, at this point we still do not know what *makes them green*.

Guiding Principles for Green Jobs

In the spring and summer of 2008, I had several, shall I say, “spirited” discussions regarding *green jobs* with Brad Kemp, a good friend of mine, formerly a labor market consultant for the California EDD Labor Market Information Division, now Director of Regional Research for Beacon Economics. At the time, we less understood the “how” of *green job* preparation than the “why.” The notions of family-supporting, livable wage jobs with upward mobility potential in pursuits that preserve environmental quality are unassailable. And Brad (who, by the way, won most of our debates) continued to remind me that there is little *green* about a job if its processes and outcomes do not consider the environment. Further, he suggested that we not only look at *green jobs* in ideal or absolute terms--zero consumption, zero waste, zero pollution--but in relative terms that allow for variations in greenness between occupations.

Each insight was helpful, but we still needed a way to look at this knowledge in terms that could be used practically and daily by local workforce developers as public resources should not support employment activities related to *green* if they are not authentic. Recently, I came upon a succinct *green jobs* definition suggested by Kathleen McGinty, Pennsylvania’s Secretary, Department of Environmental Protection. I found McGinty’s definition based on core principles appealing and with minor modification, I believe it can serve as an initial set of ***Guiding Principles for Green Jobs*** to help federal workforce developers and policymakers in daily use.

According to Secretary McGinty, a *green job* means:

- What you make reduces greenhouse gases (your product/service)
- How you make your product or provide your service is *green* (your process)
- Your intention is environmentally friendly (your purpose)

I propose a slight modification of these principles to accommodate evaluation of *green job* training and education, and employment opportunities.

Under my modified definition, a *green job* means that:

- What you make or provide contributes to the reduction or elimination of greenhouse gases and/or other agents of environmental degradation (product/service)
- How you make your product or provide your service is environmentally sustainable (process)
- Your work functions and outcomes are intended to be environmentally respectful and lead to value (purpose)

Applied Definition of a *Green Job*

Using the definition of a job provided by BusinessDictionary.com or the BLS definition of an occupation, a generic, applied definition of a *green job* would be described as:

A group of homogeneous tasks related by similarity of functions. When performed by an employee in an exchange for pay, a job consists of duties, responsibilities, and tasks that are (1) defined and specific, and (2) can be accomplished, quantified, measured, and rated. **Or,**

A set of activities or tasks that employees are paid to perform. Employees that perform essentially the same tasks are in the same occupation, whether or not they are in the same industry. Some occupations are concentrated in a few industries, while other occupations are found in the majority of industries. **And,**

1. What is made or provided by the incumbent contributes to the reduction or elimination of greenhouse gases and/or other agents of environmental degradation (products/services)
2. How a product or service is made or provided by the incumbent is environmentally sustainable (processes)
3. The incumbent's work functions and outcomes are intended to be environmentally respectful and lead to value (purpose)

I make this suggestion not to supplant good definitions already circulating, but rather to offer an additional *green jobs* definition that incorporates guiding principles for use by those tasked with developing curricula for *green* skill development, those providing guidance on *green* careers, and those who connect workers to *green job* opportunities.

Across the U.S., hundreds of thousands of workers perform job functions in roles that embody one or more of these suggested principles, especially those working in the energy efficiency and renewable energy sectors. I believe it is the degree to which job functions considered *green* comply with these principles, not whether or where they exist that has fueled much debate. Such compliance must be assessed on a case-by-case basis using rigorous, yet reasonable criteria. **It is the production or provision of sustainable goods or services in a sustainable manner with the intention of protecting and preserving the environment that makes a job *green*. It is the degree to which job outcomes, processes and intentions are sustainable that determine its greenness.** Those engaged in *green* economy research like Beacon Economics and Economic Modeling Specialists, Inc.¹⁷ have begun to articulate this fact.

Outcomes-Based Criteria for *Green Jobs*

In its August 2008 report, "*Green Collar Workers and Other Mythical Creatures*" the Labor Market and Career Information Division of the Texas Workforce Commission (TWC) suggested six distinct approaches to assessing the merits of *green jobs* training programs under the Green Jobs Act of 2007. Five of their suggested approaches have utility in specific instances, however, the sixth--*Outcomes-Based*--is the most intriguing. Identified below are the five approaches TWC believes might be used to evaluate *green jobs* training programs under the Act, along with their inherent drawbacks (according to TWC) given the nature of our existing industry classification and labor market information systems.

<u>Approach</u>	<u>Drawback</u>
Industry-Based	Firms in some industries may be accomplishing one objective behind policy mandates without necessarily being green. Not all technologies used by firms in a sector are equally green.
Firm-Based	The greenness of economic activities will vary within one firm from one of its establishments (i.e., facilities or subsidiaries) to the next.
Establishment-Level	Does not provide a method for distinguishing green workers from other employees in the same industry, firm or establishment.
Occupational	Under an occupational approach, one could identify any occupation that had green elements to it, e.g. sometimes used green building materials. But such definitions, while yielding a coveted occupational list, offer little legitimate insight into the extent of green work activities.
Task, Project or Location-Based	The greenness of workers' activities may vary from one day to the next, by task/work assignment, project or work location.

Discussed below, TWC's *Outcomes-Based* approach to evaluating *green* training projects is compelling, although standards for each measure would be needed following a pilot phase to test their efficacy. Further, the measures proposed may be somewhat unwieldy in cases of single training experiences such as on-the-job training (OJT), or in direct job placements, but they may serve as excellent criteria for large-scale training programs, customized projects, and educational systems.

According to TWC, it should be incumbent upon any party submitting a proposal [for funding under the Act] to quantify the following:

- 1) For the job designated as the object of green education and training under WIA's Title X (herein called the "*target-job*"), what are the **net energy savings** relative to a comparable job producing the equivalent conventional product or one, which uses a more conventional production process?
 - a. This dimension would allow the proposer to build a case for training or retraining workers (regardless of their occupational classifications) to be productive as telecommuters who ostensibly would have a smaller carbon footprint while generating the same output.
 - b. It would give preference to training workers for remanufacturing any product over those who make the same product from scratch.
- 2) What does the target-job contribute to the **net reduction in the carbon footprint** of the worker's employer or of consumers who buy/use the firm's goods and services?
- 3) Will the **KSAs** required to perform the job be so **radically different** that:
 - a. A new curriculum will have to be devised to impart the required KSAs;

- b. Once the KSAs have been mastered, the worker will be more productive and add more value to the firm's goods and services than his or her non-*green* counterpart; and
- c. Will the productivity gains (in terms of efficiency or value-added) warrant some sort of *green* wage premium, salary or bonus?¹⁸

According to TWC, beyond the first round of Title X funding, the *Outcomes-Based* approach could be used by economic development corporations (EDCs), regional competitiveness centers (RCCs), or state-level development offices in evaluating competing proposals for financial incentives to start up or grow specific firms.¹⁹ TWC also recommends *green*-focused *Employer Services* that may be part of a larger *green jobs* training or employment program.

They include:

- Re-examination of energy consumption and emissions over the lifecycle of the goods and services produced by the employer.
- Development/revision of business strategies to turn emission control, carbon capture and sequestration, alternative energy production, remanufacturing, reuse and/or recycling into profit centers.
- Redesigning of production and delivery processes to be more energy and resource efficient.
- Revision of work assignments (e.g., telecommuting, four 10-hour workdays) and/or altering the workplace (e.g., lighting, insulation, temperature control, energy source) to conserve energy and to reduce the carbon footprint of both the firm and its employees.
- Modification of community services and philanthropic efforts to include *green* projects designed to enhance environmental quality where their employees work or reside.

Such services would help employers achieve sustainable profits in the new age economy where consumers are increasingly environmentally sensitive and energy-conscious. Thereby, they would indirectly stimulate business expansion and job creation.²⁰

Combined with *Guiding Principles for Green Jobs*, workforce authorities and developers can use the ***Outcomes-Based Criteria for Green Jobs*** suggested by TWC to create powerful new, standards-based programs able to meet the skill needs of America's *green* activity industries with the knowledge that federal, state, and local goals for *green* workforce development are being met. For those who design, implement and evaluate local programs, however, these criteria should serve as a starting point, not an end.

Green Evaluation Criteria for Service Occupations

Where products are tangible, they lend more easily to an evaluation of greenness. For example, it is probably easier to calculate the greenness of jobs at a firm that only produces tankless water heaters which reduce electricity and water consumption, versus the greenness of jobs in accounting or consulting firms where *services* are mostly intangible or knowledge oriented--analysis, content, recommendations, consultation. To complicate the evaluation picture further, transportation activities or the distribution and sale of goods might be involved in the delivery of a *service* pointing to a number of players (workers) in the service delivery chain, each practicing different *green* habits, some practicing none. In other cases, goods may be converted in the process of delivering a service (e.g., food preparation).

According to BusinessDictionary.com, *services* are:

Intangible products that are not goods (tangible products), such as accounting, banking, cleaning, consultancy, education, insurance, know how, medical treatment, transportation. Sometimes services are difficult to identify because they are closely associated with a good; such as the combination of a diagnosis with the administration of a medicine. No transfer of possession or ownership takes place when services are sold, and they (1) cannot be stored or transported, (2) are instantly perishable, and (3) come into existence at the time they are bought and consumed.²¹

Evaluating *green service occupations* and the companies that employ them can be a challenge. To aid in evaluation, some variation of the following *green* indicators could be asked of: 1) applicants for federal funding to train workers for *green jobs* in service-oriented activities; and 2) companies in which workers will be placed in *green* service jobs where federal workforce incentives or subsidies are provided:

1. Consumption, Waste, or Pollution: What sources of consumption, waste or pollution are typically associated with the target occupation (e.g., fuel inefficient cars, vans, trucks or other vehicles used to transport people or materials, or raw materials, workplace equipment, or facilities with low sustainability aspects) and what mitigation measures are planned or are in place with prospective employers? If the employer is also the trainer, ask the company to provide responses specific to its firm, and if appropriate, to its suppliers.
2. Mitigation Measures: Are planned or implemented mitigation measures against consumption, waste or pollution systematic and ongoing as opposed to being ad hoc, temporary, or confined to a single space/location, or the functions of a single employee?
3. Energy Efficiency or Sustainability Plans: Does the company in which the trainee will be placed have an identifiable and substantive energy efficiency or sustainability plan with clear and measurable goals for reduced waste and/or consumption? If yes, is the plan currently underway, what progress is being made, and are targets being met?
4. Contributions to Sustainable Products, Services or Systems: Measured in annual sales, projected revenues, product mix, or number of employees (as appropriate and applicable), to what degree does the company's service(s) contribute directly to or support the production or delivery of environmentally sustainable products, services, or systems, either tangible or intangible.

Adequate responses to these questions based on specific criteria and metrics developed locally for major industries and business categories can provide workforce developers some assurance that the service job in question contributes to the goals of sustainability.

Green Jobs Advisory Panels

Local workforce development agencies should consider forming **Green Jobs Advisory Panels** to: 1) evaluate responses to applications for training projects that involve *green* service occupations, including input on curriculum content and prospective employment locations; and 2) provide recommendations to program funders. These panels may include owners of environmentally conscious businesses, energy efficiency professionals, instructors, regulators, *green* architects, skilled tradesmen and women, and other appropriate sustainability experts.

Where a single job-seeker is placed in a firm as a *green* worker, the *Green Evaluation Criteria for Service Occupations* suggested above can be addressed on a questionnaire filled out by the employer. A

sustainability expert could conduct a preliminary work-site visit to verify employer responses. Similarly, the South Bay Workforce Investment Board conducts an on-site visit to facilities proposed as training sites by applicants for WIA funding, and eligibility determination includes the use of an industry expert to assess the currency of the applicant's training equipment, supplies, instructors, and proposed curricula.

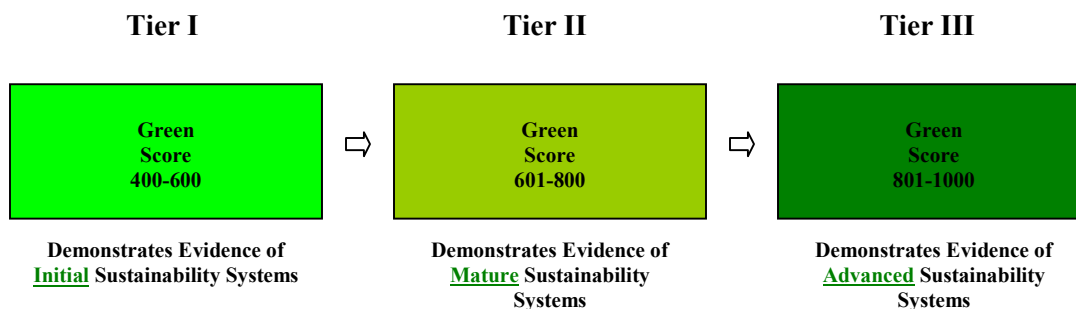
Where the need is immediate, withhold the *green job* designation until after placement, following which, a questionnaire can be completed by the employer, supported by an on-site verification by a sustainability expert. Over time, such practices will result in a critical mass of verified *green jobs* and employers in local labor markets. Comprised of appropriate content experts, *Green Jobs Advisory Panels* can also inform local workforce investment entities on training projects and placement opportunities for non-service occupations as needed.

Imbued with appropriate standards and specificity for individual occupations, industries, and business types, *Guiding Principles for Green Jobs* and *Evaluation Criteria for Green Service Occupations*, as proposed, can help workforce development practitioners make intelligent choices when designing or modifying curricula and training programs in support of local, state, and federal goals.

Green Employer Certification

In a November 2008 *Coalition* meeting, Dr. Lance Williams, President of the *U.S. Green Building Council Los Angeles Chapter* and Co-Facilitator of the *Coalition's Industry Intelligence Group*, recommended that criteria and standards for evaluating the sustainable business practices of *green* employers be developed for use by local workforce entities. The *U.S. Green Building Council (USGBC)* is a major actor in the national and international sustainability movement and has developed standards and guidelines for *green* design and building as embodied in the *Leadership in Energy and Environmental Design (LEED)* system. Currently, the *USGBC* is recommending LEED standards for new construction throughout California, which if adopted, promise to greatly reduce greenhouse gas emissions in the state.

Green Employer Certification System



Similar in concept to the LEED system for *green* design and building, workforce investment boards around the country developed and implemented systems and criteria for certifying their One-Stop Career Center operators, facilities, and services in the late 1990s and early 2000s based on quality concepts popularized by the Malcolm Baldrige National Quality Award system for private sector companies. Following passage of the WIA in 1998, the City of Los Angeles WIB, the County of Los Angeles WIB, and the South Bay WIB were among the early adopters of quality certification systems for One-Stop Career Centers in the U.S. In fact, the South Bay WIB received an award for its One-Stop Quality Certification System from the National Association of Counties (NACo) in 2003.

One-Stop quality certification entails a third-party, private sector examination and rating of the extent to which applicant facilities, planning processes, management systems, personnel, market intelligence, services, customer feedback, and performance evaluation mechanisms adhere to WIB-adopted, Baldrige-based quality principles. The South Bay WIB's One-Stop Quality Certification System is used as an organizational development tool, prescribing increasing levels of quality attainment based on a 700 point rating scale. The rating scale has three tiers--Tier I, Tier II and Tier III. In this tiered system applicants for certification are recognized and rewarded for their initiative in developing and implementing quality systems and practices while receiving support from the WIB in their progress toward higher levels of quality achievement.

With the same concepts in mind, local workforce development agencies should consider devising voluntary systems for *Green Employer Certification* to gauge the greenness of employers with whom students and program participants are placed as *green* workers. With specific, expert-developed rating criteria and assessment tools, a simple *certification system* might include the tiered *green* certification categories shown above.

In time, our collective understanding of the dynamics associated with *green jobs* training and education will evolve and become more refined. In the interim, the concepts of *Green Root Occupations*, *Green Derivative Occupations*, *Green Root Skill Sets*, *Guiding Principles for Green Jobs*, *Outcomes-Based Criteria*, *Green Evaluation Criteria for Service Occupations*, *Green Jobs Advisory Panels*, and *Green Employer Certification* as approaches to *green* workforce development can help focus federal workforce investments at the local level immediately, and measure program success in the long term.

It's Easy Being *Greener*

New KSAs are not always needed to achieve a lower carbon objective. For example, El Camino College, in cooperation with Cerritos College and the North Orange County Community College District, currently is training entry-level machinists to produce the airframe fasteners needed to meet delivery orders for the Boeing 787 Dreamliner. The Dreamliner is a more fuel-efficient and thus, greener aircraft than its predecessor. The machinist trainees at El Camino College are receiving no special instruction in sustainability, but are nonetheless contributing to a lower carbon emission outcome. In this case, the need for better fuel efficiency from a cost perspective, and research and innovation were the product drivers. While the 787 Dreamliner is not a zero emissions solution to commercial flight, it exemplifies movement in a direction that has more sustainability potential.

Greenness among occupations will often be measured in relative rather than absolute terms. That is, some jobs will support or directly result in greater reductions of carbon emissions than others, but that should not diminish or delimit the importance of other occupational functions that are moving in the right direction on the sustainability continuum. For consumers and polluters--which most of us are--the shift to more sustainable behavior and carbon neutrality will occur in phases and degrees, requiring understanding, practice, and growth.

Green & the Knowledge Workforce

In addition to adaptation, science, technology and innovation may prove to be our greatest allies in the battle to defeat global warming. A number of promising eco-tech solutions to our environmental challenges are starting to emerge; they hinge on further research and development, access to capital, and accommodating government regulations. Innovations such as Bio-char (a stable and rich charcoal produced from biomass) for carbon sequestration, improved soil fertility, sustainable (carbon-negative)

energy production, and poverty reduction; the use of algae as an alternative fuel source; and bio-organisms and nano devices that clean up toxic spills and improve solar technology hold great potential for solving some of the world's most difficult consumption challenges and contamination problems.

Sustained advances and U.S. leadership in environmental technologies, not only in terms of global warming, but in terms of competitiveness, will rely on an expansion of the nation's knowledge workforce, with a strong emphasis on *green*-centered science, technology, engineering and mathematics (STEM). Sadly, the U.S. lags other developed countries in its preparation of technologists, scientists, engineers and mathematicians. The U.S.' share of the world's scientists and engineers is projected to fall from 40 percent in 1975 to 15 percent in 2010.²² This trend must be reversed.

As reported by the U.S. Department of Labor on January 15, 2008 in the Federal Register:

There is a broad consensus that the long-term key to continued U.S. competitiveness and growth in an increasingly global economic environment is the adequate supply of qualified Science, Technology, Engineering, and Mathematics (STEM) workers capable of translating knowledge and skills into new processes, products and services. According to the *National Science Foundation (NSF)*, scientific innovation has produced roughly half of all U.S. economic growth in the last fifty years and the STEM disciplines, including those who work in them, are critical engines to that innovation and growth--one recent estimate, while only five percent of the U.S. workforce is employed in STEM fields, the STEM workforce accounts for more than fifty percent of the nation's sustained growth (Babco 2004).

The *National Academy of Sciences* study, *Rising Above the Gathering Storm* (2006), argues that:

Absent a serious and rapid response, the U.S. will lose quality jobs to other nations; lowering our standard of living, reducing tax revenues, and weakening the domestic market for goods and services. Once this cycle accelerates, it will be difficult to regain lost pre-eminence in technology-driven innovation and its economic benefits.²³

In *Thrive: The Skills Imperative*, the Council on Competitiveness states that:

Looking ahead, skills for sustainability could become a key competitive differentiator. As Joseph Stanislaw has noted: we are at the very beginning of a global race to create dominant green economies.(42) Global warming and competition for resources could very well change the ground rules of globalization-at the very least, the need to reduce carbon footprints and achieve higher resource productivity could alter corporate calculations about where and how to distribute operations and assets globally.

America could get out in front of this paradigm shift. But it is not clear that the United States will have enough talent with the right set of skills, or has even defined the path forward on skills for sustainability.²⁴

To defeat global warming, we must focus on developing both the intellectual and physical infrastructure of our country. A national campaign to promote STEM education in environmental technologies, with strong federal financing of community and public sector organizations to provide career and academic support, will make a difference.

Hypothetically, if ten percent of all high school graduates in 2009 choose to pursue a *green* STEM career today it will take them at least four years to achieve a bachelor's degree, six years for those earning graduate degrees, and optimistically, seven to eight years to acquire a PhD--time we may not be able to afford. It is suggested, therefore, that the federal government provide new, significant, and immediate incentives for currently undeclared associate, bachelor's, and advanced degree aspirants to focus their trajectories on these fields. In turn, from a supply point of view, the U.S. can potentially increase the number of available and degreed *green* STEM professionals in an abbreviated timeframe.

In Los Angeles County, *Green Root* STEM occupations include, but are not limited to:

- Computer Software Engineer, Applications 15-1031
- Computer Software Engineers, Systems Software 15-1032
- Civil Engineers 17-2051
- Environmental Engineers 17-2081
- Life Scientists 19-1000
- Biological Scientists, All Other 19-1029
- Life Scientists, All Other 19-1099
- Physical Scientists 19-2000
- Physicists 19-2012
- Chemists 19-2031
- Environmental Scientists and Specialists, Including Health 19-2041

We should also provide substantial financial incentives for educating and training incumbent, economically dislocated, and other economically disadvantaged workers who have the desire, propensity and aptitude for work in *green* STEM fields requiring at least a bachelor's degree. Local workforce investment boards, their One-Stop Career Centers, the Trade Adjustment Assistance (TAA) Program, and public two and four year educational institutions are prime vehicles for distribution of these incentives. Where such education and training subsidies are provided under the WIA Dislocated Worker or Adult Programs, participants and program operators should not be subject to federal *Common Measures* requirements.

Standards-Based Criteria for Local *Green Jobs* Education & Training

In January 2009, the South Bay Workforce Investment Board took action to establish a *Green Education and Training Provider Directory (Green Directory)* for its regional WIA-eligible education and training provider listing system--I-TRAIN--and a corresponding *Green Demand Occupations List*. Current application requirements for listing on I-TRAIN soon will be modified to incorporate additional standards and criteria enabling SBWIB to evaluate prospective *green* education/training programs and courses according to *Outcomes-Based Criteria* similar to those proposed by TWC, the *Green Evaluation Criteria for Service Occupations* suggested on pages 13-14, and the *Guiding Principles for Green Jobs* recommended on page 11. Specific criteria and evaluation tools will be developed in consultation with area sustainability experts from the public and private sectors.

The *Green Directory* will become a credible skill development reference tool for *green jobs*, backed by rigorous, yet realistic evaluation criteria for use by employers, local workforce investment boards, county welfare agencies, schools, colleges, and universities, economic developers, and community-based organizations throughout Southern California. Such a directory of verified, standards-based *green jobs* education and training programs in the region will expedite job-seeker connections to the best available providers of skill development for work in the *green* economy while adding additional *green* credibility to programs and providers of federally-funded occupational education.

A Bit of Local Workforce Investment History

Under the direction of Jan Vogel, Executive Director, and management of Andrew Munoz (currently Director of the Orange County WIB), the South Bay Private Industry Council (now South Bay Workforce Investment Board) submitted a proposal to the U.S. Department of Labor (DOL) in early 1995, requesting and receiving \$18,000,000 in funding to support implementation of Southern California's regional Private Industry Council (PIC) Aerospace Network (PAN) Project. Under then Secretary of Labor, Robert Reich, the PAN grant at that time was the largest local dislocated worker project ever funded by DOL.

The PAN Project included all of the PICs serving the cities and counties of San Diego, Orange, San Bernardino, Riverside, Los Angeles, Ventura and Santa Barbara. Over its life, the PAN Project successfully provided retraining and employment services to more than 15,000 workers displaced from jobs in California's declining aerospace industries, many of whom were knowledge workers with backgrounds in science, technology, engineering, and mathematics.

The centerpiece of the PAN Project was its Training Vendor Directory (Directory), a collaboratively formed list of training and education providers who were certified eligible under federal Job Training Partnership Act (JTPA) guidelines to serve dislocated workers. It included all JTPA-approved technical training providers with which each participating PIC had a current or recent relationship. Prior to the Directory, recipients of JTPA Dislocated Worker services usually had access *only* to schools and colleges approved locally by individual jurisdictions, which severely limited training access in many cases. With the advent of the Directory, all PAN participants could receive retraining at *any* school or college approved for project use.

The Directory featured over 400 JTPA-approved entities offering approximately 1,200 separate occupational programs for dislocated workers. The Directory was later renamed the "Intrastate Training Resource and Information Network (I-TRAIN) System." Under WIA, I-TRAIN evolved to include three categories of training and education providers approved for individual participant referrals:

- Public
- Private
- Community-Based

Currently, the following minimum criteria are used to evaluate applicant eligibility for placement on one or more I-TRAIN directories and receipt of WIA participant referrals:

- Labor market demand for the proposed occupational program(s)
- Wage at placement
- Price competitiveness
- School and program accreditation
- Past performance (Placement Rate)
- Commercial availability of the proposed occupational program(s)
- Adequacy of facilities, instructors, equipment, and curricula

After placement on I-TRAIN in the appropriate category, SBWIB monitors the provider's performance on a quarterly and annual basis to determine its continued eligibility to receive trainee referrals. Performance results are reported to SBWIB and other WIBs that currently require provider listing on I-TRAIN in order to receive participant referrals from their agencies.

Agencies that recognize the certification and eligibility of schools listed on I-TRAIN include, but are not limited to the County of Los Angeles WIB, the City of Los Angeles WIB, the Foothill WIB, and the

South Bay WIB. The Los Angeles County Department of Public Social Services-Greater Avenues for Independence (GAIN) Program also acknowledges the eligible schools and occupational programs listed on I-TRAIN for referrals of TANF (Temporary Assistance to Needy Families) recipients under its county-wide, SBWIB-operated, Subsidized Transitional Employment Program (STEP).

Because of the expanded *customer choice*, and I would add--*market diversity*--solutions to federally subsidized occupational education recipients created by the Directory, this cooperatively developed system was among the regional collaboration models that informed DOL's inclusion of the *Eligible Training Provider List* (ETPL) provision in WIA. Similarly, an expanding, criteria-based list of *green* teaching institutions has the potential to greatly broaden market choices for consumers of *green jobs* education and training funded by WIA and the Green Jobs Act.

What America's Federal Workforce Investment System Can Do *Now* to Develop a *Green* Workforce

A primary role of the federal workforce investment system is to provide counter-cyclical responses to downturns in the U.S. economy and job market. For *green jobs*, this role can provide a critical economic development support function. Stimulated by federal investments in the *green* economy, industries with *Green Root Occupation* growth will provide new opportunities for employment and pathways out of poverty for many of America's workers and their families.

Although it is difficult to identify America's distinctly *green* industries given the nature of our current industry classification and labor market intelligence systems, at the moment we *can* determine the industry locations of known *Green Derivative Occupations*, their *green* roots, and corresponding employment growth or decline. It should be mentioned that currently depressed economic conditions may stultify recent and more optimistic growth forecasts for *green jobs*. Accordingly, it will be important for local-level workforce entities to engage in ongoing communication with employers, economic developers, labor market consultants, and economists to assess present industry and labor market conditions, and realistic expectations for the future.

Soon, more industries will respond to growing consumer demands for *green* goods and services, as well as to current and imminent climate change legislation by converting to more sustainable production/delivery methods. In turn, these more sustainable firms will drive further transformations of once classic occupations to *green*. Given the scale and structure of our national labor market information and industry classification systems, it will take time to broadly capture consistent, reliable, and specific information on *green job* growth across state and local labor markets, particularly in cases of emerging occupations. In the interim, there *are* measures that can be taken by the federal workforce investment system at the local level to begin the process of preparing workers for employment in *green* activity industries.

The federal workforce investment system consists of federal, state, and local policymakers and regulators, and a wide network of federally-funded employment, training, education, and support entities, many housed at certified One Stop Career Centers. Federal workforce investment authorities at the local level are responsible for planning, budgeting, regulating, evaluating, and allocating resources to contractors and vendors for employment, training, and supportive services designed to attach economically disadvantaged workers to gainful labor market opportunities. In the last fifteen years, these functions have expanded to emphasize the role of *public intermediary*, a broker or convener of community stakeholders seeking effective matches between providers of skills and employment.

Enabled by an existing national policy framework, and an existing service delivery infrastructure in nearly every American community, with adequate funding, the following actionable recommendations are offered for what America's federal workforce investment system can do now to develop a *green* workforce for a sustainable future.

Recommendations

Federal & State Labor Market Information Systems

- Expand national occupational data collection systems to recognize and track *green* industries and occupations.
- Monitor employment growth in *green* activity industries i.e. Energy, Utilities, Construction, Transportation, and others, and provide specific geographies with regular updates on increases or decreases in projected employment growth and decline at the occupational level.
- Within *green* activity industries, identify GROs with average to above average growth rates and provide such information to localities for use in planning.
- Provide state-level data on known GROs and disaggregate GRO information for use at the county, city and consortium levels.
 - Examine currently identified *green jobs* and trace them back to their GROs using DOL-recognized occupational analysis tools. In some cases, the root occupation will be evident in the job title; in other cases there may be no close match—these may be GDOs, or new and distinctly *green jobs*, which merit their own occupational classification.
 - Match GROs to their GDOs by industry. Eliminate duplicates--jobs of different names with the same or nearly identical KSA requirements--where possible and determine the most appropriate occupational classification for each.
- Conduct state-level employer surveys to identify trends in *green* activity based on demand for GRO skill sets and, as appropriate, specialty skill sets requiring additional training or certification. Identify and communicate to localities instances where *green* activities are taking place where there is no close match to known skill sets. Such identification may serve as an early indicator of future *green* skill shortages.
- Conduct follow-on investigations of emerging *green* activities by industry to obtain additional occupational characteristics in cases where unique *green* work functions and skill requirements have been identified. Such investigations should be conducted in cooperation with: businesses, local workforce investment boards, job service offices, colleges and universities, One-Stop Career Centers, labor unions, economic development entities, industry associations, professional organizations, and other appropriate entities. Share results with appropriate federal, state and local entities, and the business community.

Conduct focus groups with leading *green* employers to provide them labor market and economic information; to gain their insights on labor challenges, needs, and trends; synthesize findings, and share results with appropriate parties.
- Promote recognition and incentive systems for exemplary green employers.

Federally Funded Local Workforce Development Entities

- Establish *Green Demand Occupations Lists* based on current labor market projections for GROs. Placement on the list should be based on average to above average growth rates and wage levels for the area. Demand for GDOs will be established by evidence of demand for their GROs. However, within growth projections for GROs, labor market information systems must verify specific GDO growth or decline based on current and projected demand for KSAs integral to *green* activity in local industries.
- Adopt *Guiding Principles for Green Jobs* similar to those discussed in this document.
- Adopt, and amend as appropriate, *Outcomes-Based Criteria* for *Green Jobs* training and education programs similar to those proposed by the Texas Workforce Commission.
- Offer *green*-focused *Employer Services* similar to those suggested by the Texas Workforce Commission as part of a larger employment and training or business services program for prospective *green* employers in the area. Recipients may be good candidates for *Green Employer Certification*.
- Adopt *Green Evaluation Criteria for Service Occupations* to: 1) assess the sustainability aspects of *green job* training programs; and 2) assess the sustainability of businesses and work environments in which federal program participants will be placed as *green* workers.
- Establish *Green Jobs Advisory Panels* to: 1) evaluate responses to applications for training projects that involve *green* service occupations, including input on curriculum content and prospective employment locations; and 2) provide recommendations to program funders. Such panels should be comprised of owners of environmentally conscious businesses, energy efficiency professionals, instructors, regulators, and other appropriate sustainability experts.
- Establish a system for voluntary *Green Employer Certification* to verify and rate the sustainable business practices of employers with whom students and program participants will be placed, particularly those who receive federal workforce investment incentives or subsidies. Consult with verified *green* businesses, energy regulators, and other sustainability experts to devise evaluation tools, specific rating criteria, and application procedures. Certified *green* businesses could be prime candidates for local recognition and incentives.
- Establish a *Green Education and Training Provider Directory* for stakeholder use. For placement on the directory ask how proposed instruction will address *Guiding Principles for Green Jobs* and either: a) at least one of the *Outcomes-Based Criteria* discussed earlier, or b) the *Green Evaluation Criteria for Service Occupations* recommended herein.
- Collaborate with union apprenticeship representatives to assist in candidate recruitment in cases of severe worker shortages and in other instances where assistance is warranted. Consider establishing additional apprenticeship preparation services in cooperation with labor unions, educational institutions, One-Stop Career Center partners, community-based organizations and/or other appropriate local entities.
- Seat *green* experts from the private, public and nonprofit sectors on local WIBs.
- Promote recognition and incentive systems for exemplary *green* employers.

Summer Youth Employment & Training Program Funders & Operators

In a reversal of the tragedy that has been nearly a decade of declining federal resources for summer youth employment programming, President-Elect Barack Obama has given strong indications that his administration will renew federal investments in this extremely vulnerable segment of our society. Such renewal offers an opportunity for the federal workforce investment system to--as it did for millions of youth in the summers of the '70s through the '90s--once again aid substantially in developing America's young workforce by assuring that those at the margins have opportunities to receive: *a first work experience*, a modest, yet crucial amount of summer income, exposure to the world of work, supplemental academic instruction, opportunities to provide service to their communities, a foothold on entry-level career pathways leading to gainful employment in the emerging *green* economy, and the beginnings of lifelong learning.

In consideration of the *all hands on deck* challenge that global warming presents, it is important that as many young minds as possible focus on sustainability solutions that assure quality of life for future generations of which they will be a part. Accordingly, for funders and operators, I recommend the following measures for renewed federal summer youth employment and training program (Summer Youth Program) activities at the local level as preparation of our youngest workers for *green* employment and careers:

- Contact public utilities, school districts, city and county parks and recreation departments, maintenance departments, housing agencies, public works departments, and HUD Community Development Block Grant programs to identify summer opportunities that provide youth ages 16 to 21 exposure to and experience in energy efficiency retrofitting for low-income households--particularly those occupied by seniors--energy audits and retrofitting of public buildings, efficiency landscaping, and water management projects that provide community service opportunities for participants.
- Collaborate with community-based organizations that are focused on and experienced in community education and sustainability to provide youth summer work-sites and supervision, and opportunities for career and academic instruction.
- Combine paid experiential activities with contextual academic enrichment, and instruction in basic principles of sustainability.
- Identify and develop opportunities for Summer Youth Program participants to receive high school work experience credit for *green* community service activities, and academic credit for sustainability-themed instruction in the summer months.
- Incorporate sustainability education into year-round programming for youth and connect such programs to sustainability-focused summer work, service, and education activities.
- Where practicable, consider co-enrollment or refer youth participants to programs operated by the Conservation Corp, *green*-oriented YouthBuild agencies, Job Corp Centers, the AmeriCorps program, and other youth-oriented organizations focused on sustainability.
- Collaborate with area high schools and community colleges to facilitate youth participation in high school academies and post-secondary CTE (career technical education) programs that focus on sustainability-based academics and *green* career pathways.

- Contact nonprofit housing agencies such as Habitat for Humanity and others, to develop additional summer work and community service opportunities for youth that provide exposure to *green* design and building.
- For job-bound youth, coordinate with job service offices to provide assistance with the work permitting process and provide pre-employment and work maturity skills training; assist with referrals to employers offering full and part-time *green job* opportunities.
- Refer interested, age and education-appropriate male and female program completers to union apprenticeship programs and provide assistance with the application process. Emphasize apprenticeships that lead directly to *green* work opportunities in the skilled trades.

Other Recommendations for the Federal Workforce Investment System

- Provide funding for education and training of incumbents, economically dislocated, and other economically disadvantaged workers who have the desire, propensity, and aptitude to work in *green* STEM fields. Local workforce investment boards, their One-Stop Career Centers, the Trade Adjustment Assistance (TAA) Program, and public two and four-year educational institutions are prime vehicles for delivery of these incentives. Where such training subsidies are provided under the WIA Dislocated Worker or Adult Programs, participants and program operators should not be subject to federal *Common Measures* requirements.
- Provide immediate financial incentives for currently undeclared associate, bachelor's, and advanced degree aspirants to focus their trajectories into *green* STEM fields and careers.
- Promote a national campaign to encourage and enable opportunities for *green* STEM education and careers in environmental technology fields.
- Provide funding to support activities by public sector and community-based organizations that are designed to provide career and academic support to both high school and college-bound youth who plan to pursue a *green* STEM career.

About California's **GREEN** Workforce Coalition

California's *GREEN* Workforce Coalition (Coalition) is an eclectic voluntary partnership. Its Mission is to: *Serve as an alliance for the development of a skilled green workforce and a sustainable future.* The **Coalition** achieves this mission by gathering and discussing market intelligence on the emerging *green* economy, connecting members with information on sustainability, climate change legislation, and *green jobs*, and helping inform State of California green workforce policy. Our goal is to: *Prepare a green workforce that responds to industry demands and supports economic development and growth in our communities, in our region and in our state.*

Objectives:

- Identify new and emerging *green* occupations and corresponding training/education providers;
- Further define the characteristics of *green jobs* in Renewable Energy and Energy Efficiency along with the current and projected labor market demand for such jobs in California and L.A. County;

- Identify North American Industry Classification System sectors that correspond to *green* activity;
- Develop a plan to bolster middle/intermediate and secondary school student interest and participation in science, technology, engineering, and mathematics (STEM) education in Los Angeles County, with throughputs to sustainability-related jobs and careers.

Open to any individual or organization in California with an interest in sustainability, the *green* economy, and a *green* workforce, the **Coalition** was formed in February 2008, in a spirit of cooperation and inclusiveness and was originally conceived as a funding-oriented group. It soon evolved into a larger learning community, based on the belief that shared information and insights, cross-fertilization of ideas, and the power of networking would provide a lasting foundation on which to build a sustainable future because, together we are smarter.

As a networking and learning community, **Coalition** meetings provide a forum for discussion on sustainability and *green jobs* issues. On specific projects, the **Coalition** catalyzes and facilitates partnerships in which members can blend or align resources to address specific local issues concerning worker preparation for *green jobs*. The **Coalition** also serves as a strategic action group that enables members to mobilize and jointly solve specific *green* workforce challenges.

The **Coalition's** membership includes utilities and public authorities, consultants, and concerned individuals. In addition to organized labor, sustainable businesses, economic development, economic research, and community-based organizations, the **Coalition's** members represent many of California's key workforce preparation and development systems including the California Employment Development Department (EDD), the California Community Colleges, the K-12 public education system, the local Workforce Investment Act (WIA) system, and the California State University system.

Conclusion

The urgency associated with the affects of global warming is driving momentum to take action around the world. Everywhere, newspaper and magazine articles, Internet blogs, radio talk shows, television programs and commercials, and network newscasts are sounding a steady drumbeat of alarm. They decry the impact of human activity on the environment and insist on the need to change our collective behavior and *go green* if we are to preserve the Earth's ability to sustain future generations. Informed by the research of scores of scientists around the globe, major commercial institutions, societal institutions, and world leaders now acknowledge the symptoms and progressive effects a lack of regard for the environment is having on the Earth's climate. Many are now backing a movement to reboot world economic systems in order to avoid long-term, irreparable damage to the planet.

This article was written for workforce investment policymakers at the federal, state and local levels and local program operators, who soon will be charged with developing a workforce for *green* activities in American industries at a scale not seen since the era of FDR's New Deal. Mobilizing our nation's workforce investment system for *green* workforce development will require clarity and understanding of purpose, an understanding of relevant *green* employment demands and skill requirements, the ability to rationally prioritize resource deployment, the ability to recognize and articulate success, and the willingness to take appropriate action. Suitable actions that can be taken by the U.S. workforce investment system are many and varied but only sound planning and timely execution will enable us to successfully overcome the environmental and economic challenges we face as a nation, indeed as a civilization. The very survival of the human race, at minimum, the quality of its survival, may be at stake.

About the Author

Robert T. Mejia is Employment Services Manager at the *South Bay Workforce Investment Board (SBWIB)* located in southwest Los Angeles County, a local policy and administrative oversight authority, and distributor of federal funds to local employment and training entities under the federal Workforce Investment Act. Robert is responsible for developing SBWIB's *One-Stop Career Center Quality Certification* system and its business services program--the *South Bay Business Resource Network*. He is also the organizer, facilitator and manager of **California's GREEN Workforce Coalition**.

Between 1994 and 1996, he served as principle writer of the PAN Project grant application, and as School-to-Work Coordinator and One-Stop Career Center Systems Coordinator for the South Bay Private Industry Council. In addition to his role as Director of Grant and Contract Services, Robert served on the President's Cabinet as Title III Strengthening Institutions Coordinator for the Riverside Community College District (RCCD) between 1996 and 1999 and as CalWORKS Planning Coordinator, grant writer, and manager of the Inland Empire Economic Investment Collaborative while at RCCD.

From 2002 to 2003 Robert served on the *California Workforce Investment Board's One Stop Career Center Certification Work-Group*. Currently, he serves on the *California Public Utilities Commission's* statewide *Workforce Education and Training Task Force*. Robert holds bachelors and master's degrees in Public Administration, and has over nineteen years of management experience in workforce development.

Robert T. Mejia can be reached at the South Bay Workforce Investment Board at rmejia@sbwib.org or by telephone at 310/970-7700.

The views expressed in this article are solely those of the author, Robert T. Mejia. They do not constitute the official position of the *South Bay Workforce Investment Board*, its staff, or members of **California's GREEN Workforce Coalition**.

Notes

¹ Van Jones, and Arianne Conrad, The Green Collar Economy: How One Solution Can Fix Our Two Biggest Problems (New York: Harper One-Imprint of Harper Collins, 2008) 74.

² Legislative Analyst's Office, Cal Facts 2006 (Sacramento: State of California, 2006)
www.lao.ca.gov/2006/cal_facts2006__calfacts_econ.htm.

³ United States Census Bureau American Fact Finder, United States -- States; and Puerto Rico, GCT-T1-R. Population Estimates (geographies ranked by estimate), Data Set: 2007 Population Estimates (Washington DC: United States Census Bureau, 2007) [http://www.factfinder.census.gov/servlet/SAFFP
Population?_submenuId=population_0&_...](http://www.factfinder.census.gov/servlet/SAFFP?_submenuId=population_0&_...)

⁴ California Employment Development Department, EDD News Release No 08-74 (Sacramento: California Employment Development Department, 2008) 3.

⁵ U.S. Department of Labor-Bureau of Labor Statistics, Economic News Release - Table A-1. Employment status of the civilian population by sex and age (Washington DC: U.S. Department of Labor-Bureau of Labor Statistics, 2008) <http://databls.gov/cgi-bin/print.pl/news.release/empsit.t01.htm>.

⁶ U.S. Environmental Protection Agency, EPA Home-Sustainability (Washington D.C.: U.S. Environmental Protection Agency, 2008) <http://www.epa.gov/sustainability/>.

⁷ Intergovernmental Panel on Climate Change, Climate Change 2007: Synthesis Report, An Assessment of the Intergovernmental Panel on Climate Change, Plenary XXVII, 2007 (Valencia, Spain: Intergovernmental Panel on Climate Change, 2007) 72.

⁸ American Association for the Advancement of Science, AAAS Board Statement on Climate Change (Washington DC: AAAS, 2006) www.aaas.org/.../mtg_200702/aaas_climate_statement.pdf-AAAS 1.

⁹ American Geophysical Union, Human Impacts on Climate, Adopted by Council December 2003, Revised and Reaffirmed December, 2007 (Washington DC: AGU, 2003, 2007) http://www.agu.org/sci_soc/policy/positions/climate_change2008.shtml.

Notes

¹⁰ American Meteorological Society, Climate Change: An Information Statement of the American Meteorological Society, Adopted by AMS Council on 1 February 2007, *Bull. Amer. Met. Soc.*, 88 (Boston: AMS, 2007) <http://www.ametsoc.org/policy2007climatechange.html>.

¹¹ Jones and Conrad 12.

¹² Raquel Pinderhughes, PhD, Green Collar Jobs: An Analysis of the Capacity of Green Businesses to Provide High Quality Jobs for Men and Women with Barriers to Employment (Berkeley: Pinderhughes, 2007) 3.

¹³ United States Department of Labor-Bureau of Labor Statistics, BLS Information, Glossary (Washington DC: United States Department of Labor-Bureau of Labor Statistics, 2009) <http://www.bls.gov/bls/glossary.htm>.

¹⁴ Doug Henton, John Melville, Tracey Grose, and Gabrielle Maor, Clean Technology and the Green Economy (Sacramento: California Economic Strategy Panel, 2008) 7.

¹⁵ BusinessDictionary.com, job, Definition (BusinessDictionary.com, 2009) <http://www.businessdictionary.com/definition/job.html>.

¹⁶ United States Department of Labor-Bureau of Labor Statistics, Frequently Asked Questions, What basic concepts are essential to understanding the OES survey? (Washington DC: United States Department of Labor-Bureau of Labor Statistics, 2009) http://www.bls.gov/oes/oes_ques.htm#Ques3.

¹⁷ Economic Modeling Specialists, Inc., Data Spotlight: A Look at "Green" Occupations, Part 1 (Moscow, ID: Economic Modeling Specialists, Inc., 2009) http://www.economicmodeling.com/resources/811_data-spotlight-a-look-at-green-occupations-part-1/.

¹⁸ Marc Anderberg, Green Collar Workers And Other Mythical Creatures (Austin: Texas Workforce Commission-Labor Market and Career Decision Making Division, 2008) 21.

¹⁹ Anderberg 22.

²⁰ Anderberg 23.

Notes

²¹ BusinessDictionary.com, Services, Definition (BusinessDictionary.com, 2009) <http://www.businessdictionary.com/definition/services.html>.

²² Debra Van Opstal, Thrive: The Skills Imperative (Washington DC: Council on Competitiveness, 2008) 22.

²³ United States Department of Labor Employment and Training Administration, Notice of Availability of Funding and Solicitation for Grant Applications (SGA) for the Science, Technology, Engineering, and Mathematics (STEM) Opportunities in the Workforce System Initiative (Washington DC: Federal Register/ Vol. 73, No. 10/ Tuesday, January 15, 2008/ Notices) 2529-2530.

²⁴ Opstal 28.