

STATE LMI IMPROVEMENT THROUGH  
MINING REAL TIME ONLINE GREEN JOB ADS

PART I. COST PROPOSAL

SF-424

SF-424A

BUDGET NARRATIVE

**Application for Federal Assistance SF-424**

Version 02

\*1. Type of Submission:

- Preapplication
- Application
- Changed/Corrected Application

\*2. Type of Application

- New
- Continuation
- Revision

\* If Revision, select appropriate letter(s)

\*Other (Specify)  
\_\_\_\_\_

3. Date Received:

4. Applicant Identifier:

5a. Federal Entity Identifier:

\*5b. Federal Award Identifier:

**State Use Only:**

6. Date Received by State:

7. State Application Identifier:

**8. APPLICANT INFORMATION:**

\*a. Legal Name: Colorado Department of Labor and Employment

\*b. Employer/Taxpayer Identification Number (EIN/TIN):  
96-0738771

\*c. Organizational DUNS:  
878209295

**d. Address:**

\*Street 1: 633 17<sup>th</sup> Street, Suite 600  
Street 2: \_\_\_\_\_  
\*City: Denver  
County: \_\_\_\_\_  
\*State: Colorado  
Province: \_\_\_\_\_  
\*Country: USA  
\*Zip / Postal Code 80202

**e. Organizational Unit:**

Department Name:  
CDLE/Employment and Training

Division Name:  
Labor Market Information

**f. Name and contact information of person to be contacted on matters involving this application:**

Prefix: \_\_\_\_\_ \*First Name: Alexandra  
Middle Name: E  
\*Last Name: Hall  
Suffix: \_\_\_\_\_

Title: Director - LMI

Organizational Affiliation:

\*Telephone Number: (303) 318-8898

Fax Number: (303) 318-8899

\*Email: Alexandra.hall@state.co.us

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**\*9. Type of Applicant 1: Select Applicant Type:**

A.State Government

Type of Applicant 2: Select Applicant Type:

Type of Applicant 3: Select Applicant Type:

\*Other (Specify)

**\*10 Name of Federal Agency:**

**US Department of Labor, Employment and Training Administration**

**11. Catalog of Federal Domestic Assistance Number:**

17-275 \_\_\_\_\_

CFDA Title:

PROGRAM OF COMPETITIVE GRANTS FOR WORKER TRAINING AND PLACEMENT IN HIGH GROWTH AND EMERGING INDUSTRY SECTORS

**\*12 Funding Opportunity Number:**

SGA/DFA PY 08-17

\*Title:

State Labor Market Information Improvement Grants

**13. Competition Identification Number:**

\_\_\_\_\_

Title:

\_\_\_\_\_

**14. Areas Affected by Project (Cities, Counties, States, etc.):**

Arkansas, Colorado, Illinois, Kansas, Michigan, Minnesota, Montana, Oklahoma, Utah, Virginia, Wisconsin

**\*15. Descriptive Title of Applicant's Project:**

STATE LMI IMPROVEMENT THROUGH MINING REAL TIME ONLINE GREEN JOB ADS

**Application for Federal Assistance SF-424**

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**16. Congressional Districts Of:**

\*a. Applicant: \_\_\_\_\_

\*b. Program/Project: \_\_\_\_\_

**17. Proposed Project:**

\*a. Start Date: 11/01/2009

\*b. End Date: 04/30/2011

**18. Estimated Funding (\$):**

*a. Federal	_____	\$4,000,000
*b. Applicant	_____	
*c. State	_____	
*d. Local	_____	
*e. Other	_____	
*f. Program Income	_____	
*g. TOTAL	_____	\$4,000,000

**\*19. Is Application Subject to Review By State Under Executive Order 12372 Process?**

- a. This application was made available to the State under the Executive Order 12372 Process for review on \_\_\_\_\_
- b. Program is subject to E.O. 12372 but has not been selected by the State for review.
- c. Program is not covered by E. O. 12372

**\*20. Is the Applicant Delinquent On Any Federal Debt? (If "Yes", provide explanation.)**

- Yes       No

21. \*By signing this application, I certify (1) to the statements contained in the list of certifications\*\* and (2) that the statements herein are true, complete and accurate to the best of my knowledge. I also provide the required assurances\*\* and agree to comply with any resulting terms if I accept an award. I am aware that any false, fictitious, or fraudulent statements or claims may subject me to criminal, civil, or administrative penalties. (U. S. Code, Title 218, Section 1001)

\*\* I AGREE

\*\* The list of certifications and assurances, or an internet site where you may obtain this list, is contained in the announcement or agency specific instructions

**Authorized Representative:**

Prefix: \_\_\_\_\_ \*First Name: Gary \_\_\_\_\_

Middle Name: J \_\_\_\_\_

\*Last Name: Estenson \_\_\_\_\_

Suffix: \_\_\_\_\_

\*Title: Deputy Executive Director

\*Telephone Number: (303) 318-8032

Fax Number: (303) 318-8048

\* Email: gary.estenson@state.co.us

\*Signature of Authorized Representative: \_\_\_\_\_

\*Date Signed: \_\_\_\_\_

**Application for Federal Assistance SF-424**

Version 02

**\*Applicant Federal Debt Delinquency Explanation**

The following should contain an explanation if the Applicant organization is delinquent of any Federal Debt.

**BUDGET INFORMATION - Non-Construction Programs**

**SECTION A - BUDGET SUMMARY**

Grant Program Function or Activity (a)	Catalog of Federal Domestic Assistance Number (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	Federal (e)	Non-Federal (f)	Total (g)
1. PROGRAM OF COMPETITIVE GRANTS FOR WORKER TRAINING AND PLACEMENT IN HIGH GROWTH AND EMERGING INDUSTRY SECTORS	17.275	\$	\$	\$4,000,000	\$	\$3,753,000
2.						
3.						
4.						
5. Totals		\$ 0.00	\$ 0.00	\$4,000,000	\$ 0.00	\$3,753,000

**SECTION B - BUDGET CATEGORIES**

6. Object Class Categories	GRANT PROGRAM, FUNCTION OR ACTIVITY				Total (5)
	(1)	(2)	(3)	(4)	
a. Personnel			\$1,143,647		\$1,332,174
b. Fringe Benefits			\$374,425		\$333,043
c. Travel			\$88,000		\$108,000
d. Equipment			\$25,000		\$0
e. Supplies			\$239,021		\$100,000
f. Contractual			\$1,831,878		\$1,630,000
g. Construction			\$0		\$0
h. Other			\$51,610		\$0
i. Total Direct Charges (sum of 6a-6h)	0.00	0.00	\$3,753,581	0.00	\$3,503,217
j. Indirect Charges			\$246,419		\$249,783
k. TOTALS (sum of 6i and 6j)	\$ 0.00	\$ 0.00	\$4,000,000	\$ 0.00	\$3,753,000
7. Program Income	\$	\$	\$	\$	\$ 0.00

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Prescribed by OMB Circular A-102

<b>SECTION C - NON-FEDERAL RESOURCES</b>					
(a) Grant Program	(b) Applicant	(c) State	(d) Other Sources	(e) TOTALS	
8.				\$	0.00
9.				\$	0.00
10.				\$	0.00
11.				\$	0.00
12. Total (SUM OF LINES 8-11)				\$	0.00
<b>SECTION D - FORECASTED CASH NEEDS</b>					
13. Federal	Total for 1 <sup>st</sup> Year	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
	\$2,666,667	\$666,666	\$666,666	\$666,666	\$666,669
14. Non-Federal	\$0	\$0	\$0	\$0	\$0
15. TOTAL (sum of lines 13 and 14)	\$2,666,667	\$666,666	\$666,666	\$666,666	\$666,669
<b>SECTION E - BUDGET ESTIMATES OF FEDERAL FUNDS NEEDED FOR BALANCE OF THE PROJECT</b>					
(a) Grant Program	FUTURE FUNDING PERIODS (years)				
	(b) First	(c) Second	(d) Third	(e) Fourth	
16. PROGRAM OF COMPETITIVE GRANTS FOR WORKER TRAINING AND PLACEMENT IN HIGH GROWTH AND EMERGING INDUSTRY SECTORS	\$2,666,667	\$1,333,333	\$	\$	
17.					
18.					
19.					
20. TOTAL (sum of lines 16-19)	\$2,666,667	\$1,333,333	\$	0.00	\$ 0.00
<b>SECTION F - OTHER BUDGET INFORMATION</b>					
21. Direct Charges:		22. Indirect Charges: \$1,518,072 @ 16.2% = \$246,419			
23. Remarks:					

## **State LMI Improvement through Mining Real Time Online Green Job Ads**

### **Budget Narrative – \$4,000,000**

#### **a. Personnel – \$1,143,647**

Arkansas \$43,877

Colorado \$222,986

Illinois \$97,391

Kansas \$166,100

Michigan \$153,900

Minnesota \$100,000

Montana \$45,218

Oklahoma \$85,218

Utah \$86,957

Virginia \$0

Wisconsin \$142,000

Personnel costs are based on a number of state resources charging varying percentages of time to the project for 18 months. Grant Administrative costs in the amount of 2.5% of the grant are included in the Personnel and Fringe Benefits for the State of Colorado as the lead state and fiscal agent for the grant.

#### **b. Fringe Benefits – \$374,425**

Arkansas \$13,498

Colorado \$55,747

Illinois \$24,348

Kansas \$49,830

Michigan	\$81,000
Minnesota	\$31,400
Montana	\$11,304
Oklahoma	\$21,304
Utah	\$21,739
Virginia	\$0
Wisconsin	\$64,255

Fringe costs are an average 32.7% of project salary costs.

**c. Travel – \$88,000**

Arkansas	\$0
Colorado	\$15,000
Illinois	\$20,000
Kansas	\$0
Michigan	\$4,000
Minnesota	\$6,000
Montana	\$6,000
Oklahoma	\$10,000
Utah	\$15,000
Virginia	\$0
Wisconsin	\$12,000

Travel costs are based on states sending two staff to three project team meetings over the duration of the project.

**d. Equipment – \$25,000**

Arkansas	\$0
Colorado	\$0
Illinois	\$0
Kansas	\$0
Michigan	\$0
Minnesota	\$10,000
Montana	\$5,000
Oklahoma	\$5,000
Utah	\$5,000
Virginia	\$0
Wisconsin	\$0

Equipment costs are based on states' need for office and IT equipment for temporary staff.

**e. Supplies – \$239,021**

Arkansas	\$0
Colorado	\$40,000
Illinois	\$80,000
Kansas	\$11,021
Michigan	\$0
Minnesota	\$5,000
Montana	\$20,000
Oklahoma	\$3,000
Utah	\$60,000
Virginia	\$0

Wisconsin \$20,000

Supply costs are based on survey material printing, postage and office supplies.

**f. Contractual (Professional Services) – \$1,831,878**

Arkansas \$93,770

Colorado \$290,861

Illinois \$410,401

Kansas \$96,020

Michigan \$167,620

Minnesota \$154,082

Montana \$67,523

Oklahoma \$108,372

Utah \$188,987

Virginia \$126,878

Wisconsin \$127,367

Contractual costs are based on license, data feed cost and development activities specific to this project associated with the Conference Board Help-Wanted OnLine (HWOL) data series, licenses to allow access to pertinent Haver Analytics databases and contract staff required to complete state survey requirements.

**g. Construction – \$0**

There are no costs associated with this line item.

**h. Other Costs – \$51,610**

Arkansas	\$0
Colorado	\$0
Illinois	\$0
Kansas	\$16,610
Michigan	\$0
Minnesota	\$10,000
Montana	\$0
Oklahoma	\$0
Utah	\$25,000
Virginia	\$0
Wisconsin	\$0

**j. Indirect Costs – \$246,419**

Arkansas	\$22,000
Colorado	\$41,810
Illinois	\$18,261
Kansas	\$43,488
Michigan	\$35,100
Minnesota	\$12,600
Montana	\$8,478
Oklahoma	\$15,978
Utah	\$16,304
Virginia	\$0

Wisconsin \$32,400

Indirect costs are an average Indirect Cost Rate of 16.2% of project salary and fringe benefit costs.

STATE LMI IMPROVEMENT THROUGH  
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PART II. TECHNICAL PROPOSAL

## TECHNICAL PROPOSAL

### State LMI Improvement through Mining Real Time Online Green Job Ads

#### **STATEMENT OF NEED**

Labor market conditions have been shaped by the precipitous decline of the current recession that was preceded by only a modest economic expansion. Many states face an unprecedented level of unemployed persons and labor markets characterized by emerging trends and shifts in both structure and worker requirements that are not fully understood. With the availability of economic incentives for green industry, occupation and skill development, there is a critical need for states to identify emerging trends in employer demand for workers, the skill requirements of resulting jobs, gaps between regional skill demand and supply, and local training needs to fill skill demands. Existing information on the labor market does not fully meet these needs.

Work proposed under this grant application will provide methods for use by the national employment statistics system to fill this unmet need. State workforce agencies are interested in leveraging new technologies and data sources to increase the efficiency of labor exchange systems. One such technology makes use of real time, online job postings to provide not only current job openings, but also a rich source of information for many labor exchange stakeholders, such as workforce development professionals, training providers and labor market analysts.

Included in these vacancies is yet to be mined information on emerging industries, occupations and skills such as those in energy efficiency and renewable energy.

## **STRATEGIC PARTNERSHIPS AND ORGANIZATIONAL CAPACITY**

To complete this work, states with a history of successful collaboration formed the Help Wanted OnLine (HWOL) Consortium. Membership includes: the Colorado Department of Labor and Employment; Illinois Department of Employment Security; Utah Department of Workforce Services; Michigan Department of Energy, Labor and Economic Growth; Minnesota Department of Employment and Economic Development; Montana Department of Labor and Industry; Kansas Department of Labor; Arkansas Department of Workforce Services; Oklahoma Employment Security Commission; Virginia Employment Commission; and, the Wisconsin Department of Workforce Development. Through the National Association of State Workforce Agencies Labor Market Information Committee, the Workforce Information Council and Bureau of Labor Statistics Federal/State Program Policy Councils, many of these states have worked together to develop a framework and methodologies for use by state LMI shops in operating Job Vacancy Survey programs and delivering tools and methods for the nationwide state industry and occupational projections program.

To accomplish the proposed goals, Consortium members will serve in the following capacities: Colorado – lead state and fiscal agent for the work proposed under this grant application; Illinois – technical lead for methodology development; Arkansas, Colorado, Kansas, Michigan, Minnesota, Montana, Oklahoma, Utah, Virginia, and Wisconsin – will provide state subject matter experts to review data and summarize validation results, identify patterns among false positives, and submit recommendations for specification of the search methodologies.

A subgroup of the consortium made up of Illinois, Colorado, Minnesota, Montana (vacancy study only) and Wisconsin will gather data through employer surveys to inform methodology development. Member states that are *not* a part of this subgroup will *not* be involved in this survey activity as some have applied for funding support for such activities through other grant applications.

The Conference Board, a strategic partner in this proposal, is a global nonprofit founded in 1916 which has provided over 90 years of service to the global business community. As a global membership organization it is supported by some 2,000 major international corporate and 600 educational and government members worldwide. The Conference Board provides reliable, unbiased information to members and the public at large.

The Conference Board has a long history of developing and publishing high quality, major monthly economic indicators including: The U.S. Leading Economic Indicator, the Consumer Confidence Index, the Employment Trend Index and the HWOL Economic Series. In July 2005, the Conference Board began publishing the HWOL data series, providing much needed real time labor demand data for state and local areas. The HWOL program follows the same rigorous statistical standards used by the major Federal statistical agencies. The statistical methodologies and quality control procedures used in the HWOL program help ensure high quality economic time series data and comprehensive unduplicated micro data files of current and historical job ads. In recent years, the HWOL Program has been guided by a former Assistant Commissioner of the Bureau of Labor Statistics' Federal/State cooperative programs and an advisory panel made up of LMI research chiefs.

The Conference Board will provide expertise and insight into the HWOL source data and assist with methodology development.

## **STRATEGY AND PROJECT WORK PLAN**

To the extent that the online job ads are captured and manipulated to exhibit statistical properties, then, the information base of job ads can feed not only the job search process, but gauge employer skill demand and measure labor market conditions. Determining the full set of interested stakeholders and the optimal method of delivering this information will be part of what will be accomplished through this proposal.

Online help wanted postings are a natural extension of traditional print ads, a history in which the job seeker is the customer base. Taking this technology one step further, online job feed services seek out and compile job postings from across the World Wide Web, using sophisticated search technology called “spiders.” This aggregation of postings is then refined to remove duplicate ads, and to make the unique listings searchable by geography, occupation and other criteria.

However, this proposal is motivated by a vision for a market niche that extends beyond the job seeker to include the workforce system, training provider and the labor market analyst. Because job ads reflect employers’ demand for workers with specific skill sets, they can be seen as communication from the employer community to the workforce development community on in-demand skills. Moreover, the types of job ads (e.g., full or part time), level of ads, and the

occupational composition of the ads are all critical indicators of labor market conditions that in the context of online job postings offer unprecedented geographic specificity and contemporaneous framework. Finally, these ads can be maintained in a longitudinal database such that trends in training demand and labor market conditions can be discerned.

HWOL is an information database capturing the daily contents of approximately 1,200 online job boards developed in partnership between The Conference Board and Wanted Technologies. Since 2008, The Conference Board has convened an advisory panel of state subject matter experts on labor market information for their counsel on HWOL programmatic initiatives. Importantly, HWOL is constructed on the basis of a frame of job boards that represents the universe of all online job postings. This frame extends back to January 2005 and has been maintained in accordance with guidelines established by the Office of Management and Budget for national statistical programs.

The emerging green economy, while not yet firmly established, holds the promise of significant growth. As such, this emerging sector is not yet fully integrated in the national infrastructure of statistical programs. This scenario presents an ideal case study for an evaluation of the potential of a real time information base that is shared among the major stakeholders in the labor exchange process: namely the job seeker, workforce development system, training provider, and labor market analyst, with a goal to realize efficiencies in the labor exchange process. One of the most unique and important features of the HWOL program is that all of the captured micro data (i.e., the full job ad postings) are entered into a longitudinal database. Within the database, researchers can follow the posting history for individual ads, individual employers, 8-digit O\*Net

occupations, detailed geographic locations, job requirements, etc. Of key importance to this proposal, researchers can search through the detailed content of each ad in the HWOL database for specific green job keywords, phrases, contextual interpretations and patterns of skill pairings. As such, states will use HWOL to: define the local green jobs sector; identify in demand green job skill sets; and, develop a methodology to construct state specific data series on green jobs and skills demand.

The thrust of this proposal extends beyond the domain of labor market information. State LMI participants will partner with the education community and local employment service organizations to broaden the scope of discussion. This grant envisions active participation by partner members in each of the three aforementioned deliverables. By virtue of their client base, these partner members bring to the research endeavor local expertise that will facilitate the definition of local green jobs, identification of local in-demand skills and development of local green job data series. Each of these deliverables involves extensive validation and evaluation that will draw upon local expertise.

Definition of the Local Green Jobs Sector: Conversations among the labor exchange process' stakeholders reflect ambiguity, and even disagreement, about what constitutes a green job. For job seekers, green jobs are defined through descriptions of skill sets, some of which may be unfamiliar. Training providers, in order to develop relevant curricula, must understand the emerging skill demands created by the rapidly changing business model within their local employer community. Among labor market analysts, there is a question of how to identify and describe the dynamics of an emerging and evolving labor sector.

To date, most efforts to clarify the definition of green jobs have relied either on the results of employer focus groups or surveys or have been extrapolated from the occupational employment in various predefined green industry clusters. These approaches have yielded timely, and yet preliminary, contributions towards an agreed upon understanding of green jobs. To the extent that these approaches have taken an industry-centric perspective, the findings may miss green job skills required by employers to change their standard business practices outside of the standard green industries. In fact, some researchers have begun to identify green business practices in support functions, such as financial analysis, marketing and operations analysis.

However, these ad hoc efforts lack the breadth of information and the potential for systematization offered by the exhaustive HWOL database. The consortium will examine various methodologies to scan the HWOL database to recognize green job postings, minimizing the identification of false positives and maximizing search efficiency. The achievement of this goal will be governed by identifying job and worker requirements sought by employers as communicated in the job postings and in a manner that is consistent with and anchored to the O\*NET taxonomy model.

These methodologies will allow for building upon the existing body of research compiled by government and non-profit agencies and for the integration of specific state and regional green initiatives. The historical nature of the HWOL database provides a unique opportunity to study longitudinal shifts in how employers define green jobs, as well as the skills required. Another

advantage is the HWOL database comes from the public domain, thereby avoiding the rigorous confidentiality constraints of traditional data sources.

Keyword matching scans job postings for instances of specific keywords, such as “LEED”, “PV”, or “Solar”, in an attempt to identify employer demand for knowledge, skills, and work activities associated with these technologies and as required by the O\*NET model. Keyword searching on “PV” may return results referring to “Process Validation”, “Product Verification”, or “Pharmacovigilance” instead of just Photovoltaic technology. Even when keyword matching correctly identifies a technology or methodology, it may fail to discern how the worker will interact with that technology. For example, keyword matching may correctly return results where “CSP” refers to “Concentrated Solar Power,” but not be able to determine whether the worker needs an understanding of that technology to provide repair services, whether the worker would be engaged in manufacturing of products that use the technology, supervising the production of such materials, or the use of the phrase simply describes the principal activity of the company and the job is for an accountant position.

Natural language processing, however, assesses the content of job postings to make such identification. It seeks to distinguish the contextual nuances present within the job posting. One challenge is to align the contextual nuances with the O\*NET taxonomy of knowledge, skill and work activities. If successful, natural language processing holds the promise of incorporating real time information concerning emerging trends in employer demand for these worker and job requirements.

This project involves extensive validation of search results. Iterations of the search methodologies, keyword search and natural language processing, will be informed by a validation of the results returned by the prior specification. State subject matter experts will review the state-specific, job posting search results for prevalence of false positives and proximity of job and worker requirements to prescribed green job specifications. When dealing with content analysis, multiple reviewers are frequently used such that an interrater reliability score can be calculated. This approach minimizes the impact of human error and helps ensure uniformity of analysis particularly, as in this case, when the ad content may not be sufficiently precise.

These state experts will summarize the validation results, identify patterns among the false positives, and submit recommendations for re-specification of the search methodologies for a subsequent run. Re-specification will be governed by an accuracy assessment measure that will establish thresholds or tolerances. Depending on the availability of resources and the constraint of project timeline, we anticipate at least three iterations of the validation process.

Identification of Green Job Skill Sets: O\*NET, a product of the US Employment and Training Administration, is recognized as the preeminent source of information on occupations and skills. The O\*NET 2009 report on green work is informative and, yet, highlights the need for additional work to identify green skills. The O\*NET five-year data collection cycle limits its utility for capturing time sensitive changes in skill requirements among emerging occupations. The lack of skill specificity within the O\*NET taxonomy has challenged the development of training programs for green jobs. And few of the emerging green occupations identified in O\*NET are

captured by federal statistical programs, which means that traditional sources for employment and wage data are not available for these occupations.

Because the O\*NET report focuses on occupations associated with green industry sectors, it cannot capture shifts in skill requirements as green work extends beyond energy or environment specific industries. Unlike some other labor market trends bounded by a cluster of industry sectors, the green impact on occupations may cross sectors, as energy efficiency and sustainability become part of common business practice.

This proposal extends the recent work completed by O\*NET researchers. Once green jobs have been defined and identified within the HWOL database, the relevant job data will be investigated for patterns among the skill sets. One aspect of this research endeavor will focus on the employer use of different terms to refer to the same skill in the same job posting. The pervasiveness of such an occurrence impacts not only the efficiency of a job search, but the understanding of green skills and the demand for green skills. The more complete taxonomy of green job language will have positive implications for communication between the employer and workforce development and training provider community. Another aspect the consortium will explore is the configurations of skills. For example, does the requirement for knowledge about photovoltaic cells usually coexist with other skills? Will the individual be using the technology directly, supervising another worker utilizing the technology, researching the technology, or simply working for a company that implements the technology to manufacture its products?

The analysis of skill synonyms and skill pairings opens up the possibility of parsing green specific content from other aspects of occupational skills. Those in building trades may need to enhance their knowledge of green materials, while the skills they use remain the same.

Compliance officers may only need to add knowledge of new or additional regulations. And, green marketers may differ from their traditional counterparts only in the need for additional knowledge on green technologies. The O\*NET content model could be augmented by the addition of green specific skills or knowledge, that maintain the characteristics of being cross-occupational and transferable.

These two perspectives also offer unique consequences for the job seeker search for work, the response of training providers to training demand from employers and the understanding of labor demand by labor market analysts. By enlarging the focus on green industries and green jobs to include the green skills employers need from workers – now and moving forward – we will move toward measuring and enhancing the alignment of green labor supply and demand.

Development of Methodology: The Conference Board objectives for the new HWOL program were to develop a comprehensive unduplicated micro data file of all current job ads which could be used to help streamline the process for job seekers in quickly identifying employment opportunities, and to create high quality economic time series data for the analysis of occupational labor demand at the national, state and local levels. Because the full content of each ad is maintained in the database, once green job and skill definitions have been agreed upon, then economic time series data and trends for state and local areas can be quickly developed from May 2005 forward. The statistical methodologies and quality control procedures used in the

HWOL program help ensure comprehensive unduplicated micro data files of current ads and high quality economic time series data.

The Conference Board definition of advertised online job openings uses its unique longitudinal posting history, which is maintained for each ad, to identify and count only those currently active job board ads appearing during the survey reference period. In the job counts, new ads are distinguished from reposted/refreshed ads, and staffing agency ads are distinguished from direct employer ads. For the economic time series data, HWOL concepts have been aligned with the BLS unemployment concepts to provide a more meaningful comparison and analysis of state and local labor supply and labor demand.

In order to ensure a comprehensive and accurate count of all unduplicated online ads, the HWOL program has put in place statistical methodologies to address the major sources of undercount error, such as newly created job boards (births) and overcount error (extensive spidering among job boards) often present in developing micro data files of online job ads. The overcount error is especially pervasive, as duplicate ads can account for two-thirds to three-quarters of the initially collected data each month. The ongoing quality of the micro data and economic time series is ensured by thorough weekly and monthly editing and quality control procedures. Time series data are maintained for each job board, and weekly and monthly edits are performed on each job board to identify atypical increases/decreases in the level of total ads relative to the job boards past history and the movements of other job boards during the same period. In combination, the adjustments for the undercount and overcount errors and thorough quality control yield robust micro data files suitable for efficient job search activities, as well as producing local, publication

quality, occupation specific time series data to support the discernment of training needs and labor market conditions.

These statistically robust, occupation specific time series are ideally suited for an investigation of trends in green sector demand and associated green skills. Because HWOL is a national statistical program, it affords the value-added to examine green jobs and skills in a variety of economic contexts. For example, some states may have a greater concentration than others in increasing energy efficiency, producing renewable energy or mitigating environmental pollution. The implication of these different concentrations for green job and skill demand has been largely unmeasured.

Much of the classification work to date on the identification of green jobs has used current taxonomies of occupational skills and occupational staffing patterns within industries. At the same time, the green phenomenon is recognized as an emerging trend. The assumptions of fit for green skill sets to an occupation or green occupations to particular industries may not be valid. As the green agenda moves forward, knowledge of whether green skills are distinct to a subset of occupations or are more diffused throughout a broad base of occupations; or, if green occupations are concentrated within a subset of industries or distributed across industries is critical. The uniqueness and power of HWOL will inform our understanding of these significant questions.

Employer Surveys: In the past year, a small number of states have conducted surveys of their employers in an effort to identify green employers and the jobs they provide. Each of these

surveys was conducted using scientific research design and sampling techniques, but differed in details sufficiently to make inter-state comparisons questionable. Experiences from the initial conduct of these state surveys are being documented by the WIC Green Jobs Study Group. It is proposed that the results of these experiences and the documentation forthcoming from the WIC provide the basis for a multi-state pilot survey that can further inform the decisions that are needed to establish a nationwide survey. The participating states will develop survey methods, instruments and techniques that will provide for inter-state comparability while also allowing for the flexibility to meet state-specific needs and demands.

Because the HWOL database is limited to job postings advertised online these survey results covering the universe of covered employment will be used to analyze the extent to which the online data available through HWOL are representative of the green economy.

Additionally, survey tools and documentation will be made available to other states desiring a standard comparable capability of measuring the growing impact of the greening economy on their state's workforce and businesses. These resources will ensure that state surveys are conducted in accordance with BLS statistical standards and in adherence with standard classification schemata. These rigorously developed estimates can then be used to track trends over time and make comparisons across states and across sub-state areas in a consistent manner.

Haver Analytics: Haver Analytics specializes in database and software products for economic analysis and business decision-making and maintains more than 150 economic and financial databases from over 550 government and private sources. Databases cover the U.S., states, metro

areas and counties. Haver Analytics is the sole provider of the Oil & Gas Journal Energy Database. States will purchase licenses to Haver Analytics to access comprehensive economic data relative to their state's economy providing context for green job vacancy and skills analysis.

## **DELIVERABLES**

- 1) A comprehensive methodology available to the public for mining online job ads to enumerate current demand in green jobs skills that can be used to create comparable intelligence on the emerging green economy across local areas throughout the nation.
- 2) A comprehensive methodology for developing economic time series on green job demand, based on archived online job ads, across local areas throughout the nation.
- 3) A comprehensive methodology and implementation strategy to achieve deliverables 1 and 2 in an electronic tool for distribution across the employment statistics infrastructure. Realization of this electronic tool will require an investment decision by the Employment and Training Administration.
- 4) A comprehensive set of reports from consortium members on their respective state green economies including industries, occupations and skills. Reports from Illinois, Colorado, Minnesota, Montana and Wisconsin will include survey results and a methodology and tools to collect comparable data across local areas.
- 5) A rapid response strategy for the employment statistics system to measure and understand trends in other prospective emerging industries, occupations or skills.

Results of the work performed under this grant proposal will be delivered via various media appropriate to the target audiences.

STATE LMI IMPROVEMENT THROUGH  
MINING REAL TIME ONLINE GREEN JOB ADS

PART III. ATTACHMENTS TO THE TECHNICAL PROPOSAL

ABSTRACT  
LEAD AND PARTICIPATING STATES

## ABSTRACT

Applicant Name: Colorado Department of Labor and Employment

Project Title: State LMI Improvement through Mining Real Time Online Green Job Ads

Area Served: Arkansas, Colorado, Illinois, Kansas, Michigan, Minnesota, Montana, Oklahoma, Utah, Virginia and Wisconsin. Realization of a distributable electronic tool for the nationwide employment statistics system will require an investment decision by the Employment and Training Administration.

Funding Requested: \$4,000,000

Work proposed under this grant application will provide methods for use by the national employment statistics system for states to identify emerging trends in employer demand for workers, the skill requirements of resulting jobs, gaps between regional skill demand and supply, and local training needs to fill skill demands. The Help Wanted OnLine Consortium will leverage new technologies and data sources to increase the efficiency of labor exchange systems. These technologies make use of real time, online job postings to provide not only current job openings, but also a rich source of information for many labor exchange stakeholders, such as workforce development professionals, training providers and labor market analysts. Included in these vacancies is yet to be mined information on emerging industries, occupations and skills such as those in energy efficiency and renewable energy.

The outcome will be the genesis of a rapid response strategy for the employment statistics system to provide timely, critical information on other emerging industries, occupations or skills.

STATE LMI IMPROVEMENT THROUGH  
MINING REAL TIME ONLINE GREEN JOB ADS

**Lead State –**

Colorado Department of Labor and Employment

**Participating States –**

Arkansas Department of Workforce Services

Illinois Department of Employment Security

Kansas Department of Labor

Michigan Department of Energy, Labor and Economic Growth

Minnesota Department of Employment and Economic Development

Montana Department of Labor and Industry

Oklahoma Employment Security Commission

Utah Department of Workforce Services

Virginia Employment Commission

Wisconsin Department of Workforce Development