

CALIFORNIA GREEN ECONOMY SURVEY METHODOLOGY

Introduction

In the summer of 2008, the Labor Market Information Division (LMID) embarked on a study of the green economy in California. The goal was to obtain a baseline estimate of green jobs in California and identify any new or emerging occupations as a result of moving towards a more green economy. LMID also hoped to identify the current and changing business practices of both producers and users of green or sustainable products and provide the public workforce system with information necessary to develop worker training programs to support the green economy. Staffing needs and costs are not addressed in this methodology.

I. Survey Package Development

The following steps were used to develop the questionnaire and survey package:

- A. Research sources on green studies and survey information
- B. Determine structure of survey questions and effectiveness of each style
- C. Determine survey format(s) to use (e.g. paper, electronic, telephone, or a combination)
- D. Draft survey questions, get consensus and make revisions as needed
- E. Test Survey using stakeholders and employer focus groups to vet the survey
- F. Draft survey instructions, get consensus and make revisions as needed
- G. Draft transmittal letter to employers and make revisions as needed
- H. Decide how and when to mail surveys

II. Survey Questionnaire

Survey questionnaires were mailed to more than 51,100 California employers beginning in late May 2009.

The first section of the survey asked employers to identify the total number of employees at their site and, of these, how many generated products or services as identified by each of the GREEN categories. The question further asked the employer how many of those holding green jobs worked half time or more in this category.

The second section of the survey asked about an employer's green or sustainable business practices (i.e., the manner in which they operate their business) and what new skills or knowledge future employees would need for the firm to be more environmentally friendly.

The final section of the survey asked employers to estimate the number of current employees in 34 occupational categories that are involved in green work activities. This section was intended to provide a sense of the occupations affected by the movement toward environmental sustainability as well as provide information that would help focus further research into occupational skills needed to support the green economy.

III. Sample Development

Two sample groups were created. One group consisted of large firms (250+ employees) and was referred to as Certainty Units. All of these firms were sampled. The other group consisted of all remaining firms. A stratified random sampling method was used to draw the sample for these remaining firms from the Quarterly Census of Employment and Wages (QCEW).

A. Total Sample Size:

A total sample size of approximately 50,000 private and public employers were selected to survey from all geographical areas, industries, and employment sizes in California. This sample size was selected to provide a good representation of both producers and users of green products and services as well as an appropriate amount of information for further analysis.

B. Total Employers for Sample:

All employers for the sample were selected from the QCEW excluding the following:

1. Private household employers
2. Employers with “0” wages and “0” employment
3. Employers from master record of all sub-units, out of state, or foreign locations

C. Criteria:

1. Selection of employers based on geographical area
2. Selection of employers based on North American Industry Classification System (NAICS). Two-digit NAICS were used to capture a broad spectrum of employers in all industries. Three-digit NAICS were used to capture employers in more narrowly defined industries.
3. Selection of employers based on employment Size Class:
 - a. Small (0-19 employees)
 - b. Medium (20-99 employees)
 - c. Large (100-249 employees)
 - d. Certainty Units (250+ employees)

D. Number of Employers by Stratum:

Ran a report to distribute the Total Employers for Sample into strata by geographical area, two-digit and three-digit NAICS, and the four different employment size classes.

E. Weighted Percentage by Stratum

Calculate the weighted percentage for each stratum to the 7th decimal place to capture at least one employer for every stratum. The equation is:

$$\text{Number of Employers by Stratum} / \text{Total Employers for Sample}$$

F. Proportional Allocation by Stratum (Number of firms to be sampled)

Calculate proportional allocation by stratum to provide the sample size (number of employers) for each by MSA, NAICS and employment size class. The equation is:

$$\text{Total Sample Size} - \text{Certainty Units} * \text{Weighted Percentage by Stratum}$$

If the result is less than 1, but there are a limited number of employers available in that stratum, enter “1”. **One** employer will be selected for that stratum and added to the final sample size.

IV. Drawing the Sample

Used SQL programming to draw the sample from the QCEW by MSA, NAICS, and Size Class using a random number incrementor method. The following data elements were also added:

- A. Unique ID Numbers were created for each employer selected
- B. Sample Weights were calculated for each employer to produce estimates. All Certainty Units will have a weight of 1.0. The equation for all remaining firms is:
Number of Employers by Stratum / Proportional Allocation by Stratum
- C. Average Employment (employment reported for previous 3 months) for each employer

V. Sample Refinement

Verify and refine employer information in the sample to prevent large amounts of returned mail due to bad addresses, firms that have gone out of business, or other changes.

VI. Mailing Survey Package(s)

There were three separate mailings and extensive telephone follow-up to increase response rates.

- A. The survey package for the first mailing consisted of:
 - 1. Transmittal Letter signed by the Governor (see [Attachment 1](#))
 - 2. Instruction sheet on how to complete online, fax or by mail (see [Attachment 2](#))
 - 3. Survey printed on recycled paper (see [Attachment 3](#))
 - 4. Postage-paid return envelope
- B. A second survey package was sent if no response was received from the first mailing
- C. A “Last Chance” letter was sent if no response was received from first or second mailings

VII. Preliminary Results – Data collection ended January 14, 2010

While the survey team removed a small amount of employment from some respondents that clearly reported incorrectly, the vast majority of responses were accepted without verification.

- A. Data Review and Refinement

All response data was entered into a software program and then downloaded to create a response file. The file was refined and used to develop our final benchmark results.

 - 1. Respondents
 - a. If total employment number blank, use QCEW employment
 - b. If total employment is overstated, use QCEW employment
 - c. If total employment figure reported was for multiple county locations or is a statewide roll-up (not broken up by individual locations), use QCEW employment for the sampled location only. These are referred to as Atypical reporters. Set sample weight to 1.0 for all atypical reporters.
 - 2. Remove the following survey results from the file:
 - a. Duplicates
 - b. Out-of-business firms
 - c. Web entries with no responses

- d. Obvious incorrect or conflicting answers
3. Response Gaps
 - a. Look for response gaps in industries and geographical areas
 - b. Try to obtain survey responses in these under represented categories
 - c. Are responses representative of original sample?
4. Non-Respondents
 - a. Returned Mail - Search for new address and re-send survey package.
 - b. Extensive telephone follow-up attempts were made to complete a survey.
5. Convert survey responses for multiple choice questions to numerical values (see example below):
 - a. No (no response) = 0
 - b. Yes (checked) = 1
6. A Stratum ID number was assigned to all respondents or group of respondents having the same MSA, NAICS, and Size Class designation. This number consisted of the MSA code, the two or three digit NAICS code and the Size Class code.
7. Stratum Jumpers – Units that changed NAICS, MSA, or Size Class
 - a. If firm's NAICS or MSA changed, apply weight of the stratum it is jumping into
 - b. If firm's Size Class changed by two or more levels, apply weight of the stratum it is jumping into
 - c. Assign the Stratum ID code of the stratum it is jumping into

VIII. Generating Estimates

Generate estimates to apply survey responses received to an entire region or MSA. It should be noted that green employment estimates are based on employer self-identification. As with all surveys, results should be viewed with caution. While every effort was made to draw a representative sample and accurately apply weights to the reported responses, surveys are subject to both sampling and nonsampling error. The following data elements and equations were used:

- A. Response Total = *Sum of all Respondents for each Stratum ID*
- B. Nonresponse Total = *Sum of all Nonrespondents for each Stratum ID*
- C. Nonresponse Adjustment Factor (NRAF) = *Nonresponse Total + Response Total / Response Total*
- D. QCEW Average Employment - Run report from QCEW to get a total of average employment by MSA, NAICS, and Size Class for each Stratum ID
- E. QCEW Number of Firms - Run report from QCEW to get a count of all firms by MSA, NAICS, and Size Class for each Stratum ID
- F. Sum Weighted Adjusted Employment = *Employees reported in Question 1 * Sample Weight * NRAF*

- G. $\text{Sum Weighted Adjusted Firms} = \text{Response Total} * \text{Sample Weight} * \text{NRAF}$
- H. $\text{Employment Benchmark Factor} = \text{QCEW Average Employment} / \text{Sum Weighted Adjusted Employment}$
- I. $\text{Firm Benchmark Factor} = \text{QCEW Number of Firms} / \text{Sum Weighted Adjusted Firms}$

IX. Final Benchmark Results

In order to develop a baseline count or benchmark for all areas within the state, calculations were applied to each type of response received based on whether the answer was employment related or firm related. Write-in responses were entered as recorded and not included in any calculations.

- A. Calculation for employment related Questions (1, 2 and 11):
 $\text{Employees reported} * \text{Sample Weight} * \text{NRAF} * \text{Employment Benchmark Factor}$
- B. Calculation for firm related multiple choice Questions (3-10)
 $\text{Numerical Value} * \text{Sample Weight} * \text{NRAF} * \text{Firm Benchmark Factor}$

X. Response Rate

California recognized that the length and complexity of the survey would be a challenge to meet the 50% response rate goal, but felt that it was important to gather such information on green business practices, needs, and occupational detail. Therefore, it was worth the effort and risk.

The actual response rate was 35.1% based on the following equation:

$\text{Total Responses} / \text{Remaining Firms in Sample (Original Sample - Out of business - Consolidations)}$

For more information on California's Green Economy Summary of Survey Results please go to:

http://www.labormarketinfo.edd.ca.gov/contentpub/GrSurveyRpt_1115.pdf