

A Methodology for Evaluating Sufficiency of Survey Frames

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Abstract

The Energy Information Administration (EIA) has continued its strategic planning efforts to maintain and improve data quality and its movement toward employing a greater number of performance measurements. As part of that effort, EIA evaluated its own survey frames for “sufficiency.” This effort involved the development of a set of evaluation criteria that called for collecting a large quantity of information and data for each of 34 EIA master frames. An inter-office team developed the evaluation criteria and was responsible for the data and information collection and also applied the criteria to evaluate the 34 master frames. The team eventually decided that all but four of the frames were sufficient; the insufficient frames were deemed “insufficient” for a variety of reasons.

Keywords: survey frame, establishment survey, data quality, performance measures

1. Introduction

The Energy Information Administration (EIA) has continued its strategic planning efforts to maintain and improve data quality and its movement toward employing a greater number of performance measurements. As part of that effort, EIA chartered an inter-office team to evaluate its own survey frames for “sufficiency.” This team was composed of representatives from all offices involved with administering surveys. This effort involved the development of a set of evaluation criteria that called for collecting a large quantity of information and data for each of 34 EIA master frames. These 34 master frames are used to identify and store respondent information for 67 EIA surveys. The team also developed the evaluation criteria and was responsible for the data and information collection and also applied the criteria to evaluate the 34 master frames.

2. Objectives

This inter-office EIA team was charged with achieving the following objectives:

- To identify surveys having unique frames in EIA and surveys using subsets of those frames,
- To compile information regarding each frame to enable the team to make a judgment regarding the frames “sufficiency” or “insufficiency” relative to each survey’s stated purposes and goals,
- To render an informed judgment regarding each frame’s sufficiency or insufficiency,
- To make recommendations for improvement or identify challenges with respect to each frame,
- To fulfill these objectives within a reasonable time period.

3. Methodology in Determining Frame Sufficiency

Prior to the first meeting of the team, a significant amount of background material for each frame was compiled. This provided the basis for the team getting started. The team perceived its primary function as two-fold: to determine sufficiency and thus provide input into the performance measurement stated in the EIA strategic plan¹ and to make recommendations on improving all frames. In addition to the recommendations, challenges are also stated; these are defined as difficulties presently faced by survey managers with respect to frame quality. Also, any frame comparison activities presently being conducted in conjunction with another agency (e.g., frame comparisons being conducted in cooperation with the Census Bureau) were also stated.

Because survey frame “sufficiency” is not well defined, the team initially agreed upon the criteria to be employed for judging frame sufficiency. These criteria are:

- The existence of a systematic approach toward maintaining the frame,

¹ The relevant portion of the EIA 2004-2008 Strategic Plan is related to Goal #1, elements and performance measures: For relevancy and reliability of the EIA information program, the performance measure is the percentage of EIA survey frames with sufficient coverage to produce reliable supply, demand and price statistics.

- The volatility of the frame over time,
- The existence, availability and use of other EIA and third-party comparable frame listings (especially comprehensive lists),
- The existence of balancing items² and the magnitude and stability of the balancing item over time,
- The relative concentration of volumes in a relatively few respondents,
- Changes in the industry, legislation, regulations, and other exogenous considerations,
- An independent assessment by the survey manager of the quality of the frame.

While no single one of these criteria led to any specific judgment, these all played a role in leading to a determination of sufficiency or insufficiency. In deciding upon sufficiency for any given frame, the team considered whether or not the frame was sufficient for key purposes (i.e., relative to the survey's purposes and goals) and not necessarily sufficient for all potential purposes.

While some survey frame information had already been collected from an earlier information collection effort on frames, the team deemed it necessary to obtain further information from survey managers. This was accomplished using various modes of contact: the e-mail system, telephone and personal interviews. Thus, survey managers were often contacted more than once for specific information. Moreover, the team often required further clarification concerning information provided by survey managers. This necessitated further contacts with survey managers in order to obtain the requisite clarification information.

The basic information collected prior to the formation of the team was the following:

- Survey forms using the frame or a subset of the frame,

² A balancing item represents a difference between the sum of the components of product supplied and the sum of the products disposed. These differences may be due to quantities lost or to the effects of data reporting problems, including insufficient frames. Reporting problems include differences due to the net result of the effect of variations in company accounting and billing practices; differences between billing cycle and calendar time frames; and imbalances resulting from the merger of data reporting systems that vary in scope, format, definitions, and type of respondents.

- Type of data collected on the survey (e.g., supply volumes, price),
- Description of the respondents,
- Number of respondents on the frame,
- How updating is accomplished,
- How often updated,
- Last time frame was updated.

The following additional survey information and quantitative data were collected for each master frame by the team:

- Stability (or Volatility of the Frame): existence of a routine procedure to maintain the frame, availability of data to maintain the frame, number of respondents added, deleted or merged during recent updating cycles, and existence of pending legislative or regulatory issues that could affect the size of the frame.
- Corresponding Useful Listings of Frame Units or Available Survey Frames: existence of a listing or registry that offer a comparable listing of facilities or a useful subset thereof, utility of such a list and how comprehensive the list may be.
- Balancing Item, Concentration of Volume, and Other: existence and utility of a balancing item, changes in the values of the balancing item(s) over time, concentration of volumes in a relatively small number of elementary units (e.g., companies, plants, facilities) – largest 10% of facilities covers what portion of the volume, largest 20%, largest 30%, if survey is a census or a sample, and how sample is selected.

It was thought that all of the basic and specific information listed above was needed in order to make an assessment of the sufficiency of the frames.

4. Results

The team reviewed 34 EIA survey frames (For a list of these, see Table 1). Five of the frames reviewed were regarded as not being within the team's purview for evaluation. This was generally due to the fact that the survey frame was perceived by the team to be a subset of another EIA frame or the frame was being managed by an organization other than EIA. Frame definitions and frame size designations were found to be very subjective among team members and survey managers.

Table 1: EIA Surveys Associated with Master Frames

Survey Form Number	Description
Petroleum Supply	
EIA-810/820	Monthly and Annual Refinery Report
EIA-811	Monthly Bulk Terminal Report
EIA-812	Monthly Product Pipeline Report
EIA-813	Monthly Crude Oil Report
EIA-814	Monthly Imports Report
EIA-815	Monthly Terminal Blenders report
EIA-816	Monthly Natural Gas Liquids Report
EIA-817	Monthly Tanker and Barge Movement Report
EIA-819	Monthly Oxygenate Report
Petroleum Marketing	
EIA-863	Petroleum Product Sales Identification Survey
EIA-856	Monthly Foreign Crude Oil Acquisition Report
Natural Gas	
EIA-176	Annual Report of Natural & Supplemental Gas Supply & Disposition
EIA-910	Monthly Natural Gas Marketers Survey
EIA-895	Monthly Quantity and Value of Natural Gas Report
Oil & Gas Reserves	
EIA-23	Annual Survey of Domestic Oil and Gas Reserves
EIA-64A	Annual Report of the Origin of Natural Gas Liquids Production
Alternative Fuels	
EIA-886	Annual Survey of Alternative Fueled Vehicle Suppliers & Users
EIA-63A	Annual Solar Thermal Collector Manufacturers Survey
EIA-63B	Annual Photovoltaic Module/Cell Mfrs. Survey
EIA-902	Annual Geothermal Heat Pump Mfrs. Survey
Electric Power	
EIA-860	Annual Electric Generator Report
EIA-411	Coordinated Bulk Power Supply Program Report
EIA-861	Annual Electric Power Industry Report
Financial Reporting System	
EIA-28	Financial Reporting System
Coal	
EIA-3	Quarterly Coal Consumption and Quality Report, Manufacturing Plants
EIA-5	Quarterly Coal Consumption and Quality Report, Coke Plants
EIA-6A	Coal Distribution Report – Annual
EIA-7A	Coal production Report
Uranium	
EIA-851	Domestic Uranium Production Report
EIA-858	Uranium Industry Annual Survey
Consumption Surveys	
EIA-871A/I	Commercial Buildings Energy Consumption Survey
EIA-457A/G	Residential Energy Consumption Survey
EIA-846(A,B,C)	Manufacturing Energy Consumption Survey
EIA-1605B/EZ	Voluntary Reporting of Greenhouse Gases

Of the remaining 29 that were reviewed for sufficiency, 25 were deemed sufficient for key purposes, while 4 were either thought to be either “Insufficient” or given a “Don’t Know” by the team at the present time. The rationale for the insufficiency determination was primarily due to concerns about mechanisms being in

place to ensure future frame quality, or due to expected changes in the structure of the energy market or, due to changes in laws and regulations. However, merely because a frame is deemed sufficient does not indicate that there is no room for improvement or there aren’t challenges ahead to be addressed. These

recommendations for improvement and challenges are also listed in the table.

5. Future Frame Evaluations

The team believes that this was a useful exercise and an exercise EIA should conduct once every three or four years. Since EIA management began showing particular concern regarding the quality of EIA survey frames a few years ago, survey managers appear to have been engaged in various activities with the goal of improving their survey frames. It appears as though the quality of survey frames might have improved considerably due to these recent activities.

Therefore, EIA's decision to focus more management attention and resources to the development of better survey frames appears to have had the desired effect of improving the survey frames. In order to continue and extend these improvements, the team recommends that EIA maintain its management focus by continuing to assign this area a high priority.

Although the team was only assigned the task of determining survey frame sufficiency, the team noticed that there was considerable variation among the surveys regarding the degree to which changes to the survey frame were actively monitored, documented and archived. For example, some survey managers were unable to provide precise data regarding recent frame turnover (i.e., the number of new respondents added, deleted, or merged into other entities, etc.). The formal

tracking of survey frame membership might have long-term benefits both in terms of maintaining management focus and in terms of providing a baseline regarding a "normal" historical turnover rate vis-à-vis future turnover rates.

In critiquing the overall effort, processes and decisions made by the team, the team worked well together with processes that functioned well. The team recommends, however, that when a similar team is chartered for a similar future effort that the team members should be broadened to include representatives from all fuel groups rather than merely office representatives. Thus, for example, representatives from the coal division and natural gas division should be added. This would expand the team's knowledge base regarding a particular industry's practices and idiosyncrasies.

6. Summary and Conclusions

While evaluating survey frames for sufficiency is a highly subjective activity, frames sufficiency can be operationalized and prove useful in assessing the performance of a statistical agency. However, the resource commitment can be very high in order to obtain all of the requisite information from frames managers and other sources. Moreover, chartering an inter-office team to conduct these evaluations is also a resource intensive endeavor, considering the number of staff hours required to meet and arrive at decisions.