QUALITY IN FEDERAL SURVEYS: DO STANDARDS REALLY MATTER?

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INTRODUCTION

Advocates of statistical standards make many claims. Among them are that standards can:

- Improve data quality
- Correct sloppy data collection procedures
- Compensate for poorly trained survey staff
- Provide management control of survey operations.

There is considerable debate on whether any of these things are true, but one fact is certain. Implementing standards in a statistical agency is difficult, time consuming, and often very frustrating.

This paper describes the standards program at the Energy Information Administration (EIA), and hopefully provides some insight on the impact that it has had on survey quality. Five topics are covered. They are:

- The need for standards at EIA
- The purpose and attributes of EIA standards
- How EIA developed those standards
- Standards compliance and enforcement
- The impact on survey quality.

The major point to be made is that standards alone did not do the job at EIA. If standards are written and placed on the shelf with the expectation that they will be followed, it is unlikely that they will have any lasting impact on survey quality. Standards can not improve survey quality without combining them with programs of enforcement, education, and evaluation. The EIA standards program blends these elements together. Any success that it has had is a result of this mixture, and the commitment of managers and staff in all parts of the organization.

NEED FOR STANDARDS

In order to understand the development of standards at EIA, it is necessary to understand the statistical culture of the agency. The Energy Information Administration was formed more than 10 years ago from several different agencies, which were all responsible for collecting information on different forms of energy. There were as many different philosophies and methods of data collection as there were actors in the process. The range of statistical education and sophistication varied greatly. Some relied heavily on personal contacts with major energy producers to get information. Others embraced the principals of survey research. Some staff were professionally trained statisticians, while others were experts in

particular energy industries. A third group were computer programmers, knowledgeable in neither survey methods nor energy, but very competent at running the systems and producing the reports. One philosophy was common to all, "This is the way we've done it in the past, and continuing this way is good enough."

Coupled with this potpourri of techniques and technicians was a lack of faith in the accuracy and independence of the energy data and analyses being produced. There was enough concern, that when the Department of Energy was established in 1977, Congress created the EIA with a measure of statutory independence. The Administrator of EIA did not have to obtain approval from the Department before publishing data. Along with this freedom, the legislation placed high value on independent, objective, and accurate information. Congress set up a review group made up of senior officials from other Federal statistical agencies and staffed with GAO auditors to report once a year on issues of quality and independence.

This was the climate that existed at the inception of EIA. One of the early goals of the agency was to establish credibility in its data. This could be done be ensuring that the data were accurate and timely, that whatever was produced was well documented and replicable, and that it was presented clearly and correctly. It would also help if the methods of collections were clearly described to the data users, and that limitations of the data presented.

PURPOSE AND ATTRIBUTES OF THE STANDARDS

Standards were one way of establishing credibility in the data. In a manner of speaking, they were used to reorient the statistical culture and value structure of the agency.

EIA had four goals that were reflected in the standards program. They were to:

- Increase the reliability and accuracy of EIA data
- Avoid duplication, promote efficiency, and provide for the transfer of data between systems
- Ensure consistency of EIA data
- Provide for the clearest possible presentation of data.

The philosophy behind the standards was simple. The standards outlined the fundamentals of data production and data quality. Each one was to state the purpose, applicability, and required action for a specific activity in the life cycle of EIA products. They had to be straightforward and easy to understand. They were to serve as the basis of professional conduct at the agency. Good standards had three characteristics.

- They are easily understood.
- They are enforceable.
- They require few exceptions.

EIA data standards fall into three broad categories.

- Data System Standards
  - -- Contract Clauses for Data Collection and Processing
  - -- Data Systems Development
  - -- Data Systems Documentation
  - -- Programming
  - -- Frames Maintenance
  - -- Formatting Survey Frames

- Data Collection Standards

  -- Survey Form Development
  -- Handling Nonresponse
  -- Respondent Contact Records
  -- Batch Entry Procedures
  -- Edit Message Handling
  -- Performance Statistics

- Data Presentation Standards

  -- Publication of Energy Statistics
  -- Publication of Revisions
  -- Publication of Estimates
  -- Data Accuracy Presentation
  -- Statistical Graphs
  -- Nondisclosure of Company Identifiable Data in Aggregate Cells
  -- Rounding
  -- Freezing Data Files
  -- Documentation of Public Use Tapes/Diskettes.

STANDARDS DEVELOPMENT

EIA standards did not develop spontaneously. First came a clear organizational commitment from the Administrator of EIA. Formal standards would be developed, they would be agency wide, and compliance would be required, not optional.

At EIA the Office of Statistical Standards (OSS) was given the organizational responsibility for developing, implementing, and enforcing standards. However all the offices had input into the development process, suggesting standards and providing feedback. At EIA each line office is responsible for ensuring that standards are followed in its surveys. Commitment at this level is critical for success of the program. OSS is responsible for checking to see that this responsibility is being discharged. It is and must be a cooperative effort throughout the agency.

The first step in the standards development process was to generate a list of those standards needed. This was done with the basic objectives of accuracy, efficiency, consistency, and clarity in mind. Specific topics were identified that would address one or more of these basic goals.

OSS then conducted an extensive review of the current literature and interviews with other statistical organizations. This provided a basis from which to start, and served as a sanity check. It helped keep standards development from becoming an academic exercise. Seeing how standards were implemented and enforced helped level the frustration curve.

Third, OSS talked to EIA survey managers and their staff to explain its efforts. Many things came out in this process, and in fact this served as an educational process for both standards developers and survey managers. It was found that a lot of the resistance to standards centered around a general feeling that compliance would involve a great deal of work with very little payoff. Some concerns were about new requirements on already overloaded staff. Sometimes survey managers were actually ahead of standards development. OSS staff thought they had found a new problem, but the survey managers were already aware of it and were working toward a solution.

The educational aspect can not be overemphasized. Many at EIA, believe that standards and the standards development process are the required course work for bringing about the cultural changes referred to earlier. One thing is certain, without getting most of the important actors on board in your organization, the effort is doomed to failure. The process is often lengthy as details are worked out, but the more effort

spent at this stage, the more time spent with the people on whom the standards will impact, the fewer problems will be encountered at the next stages.

Next, standards were drafted. Work was divided up among the staff, paying particular attention to the individual's areas of expertise. This may seem like an obvious thing to do, but there were a few mismatches in the beginning. As a result some standards were, at best, superficial, because they were developed by individuals who had only a limited knowledge of the subject area.

Once the standards were drafted, a formal agency review process was started. At EIA the standards were separated into manageable groups. It allowed some standards to be in place while others were still being negotiated. The process of consultation and approval took well over a year after the draft standards were developed.

The final part of the process at EIA is periodic review and update. EIA conducts a major standards review about once every three years. New standards are developed, old ones are scrapped, and revisions are made where needed. Technology changes are one major reason for changes to standards. At EIA more surveys are moving from a mainframe to PC environment. Electronic data submission is increasing. These new ways of collecting and processing data require new standards. In addition some of the standards just did not work well. One example is the performance statistics standard. The approval process was difficult and the resulting standard requires that these measures of survey performance be kept at an aggregate level. Quality assurance reviews are discovering that survey managers are keeping these statistics to comply with the standard, but they are not used as much as they could be. A change in the standard as well as increased education in the use of performance statistics may be needed to ensure that the standard has its desired impact.

STANDARDS COMPLIANCE AND ENFORCEMENT

Coupled with standards development at EIA is an active program of standards compliance and enforcement. This program takes several different forms.

- Category I Clearance
- Publication Reviews
- Documentation Reviews
- Quality Audits.

Category I Clearance

At EIA all new or substantially revised publications undergo a process of review and signoff prior to release to the public. The review, called Category I Clearance, checks for compliance with the various publications and graphs standards. Also reviewed, is the soundness of the analysis and presentation of data. This is the point at which EIA can be sure that its publication standards are being met.

One problem is that different reviewers have a tendency to look for different things. This can be particularly confusing and frustrating to authors who are looking to "pass" the review and get the product to the printer on time. Standards help to alleviate this problem by establishing minimum acceptable levels of publication quality while providing both authors and reviewers with guidance.

Publication Reviews

To supplement these reviews EIA periodically reviews its recurring publications. These reviews primarily

examine the graphs, tables, and explanatory notes to see that standards are met. When problems are uncovered, the responsible program office is notified, and there is a formal recommendation and followup procedure in place. Most of the core publications of EIA are reviewed at least once every four years.

Documentation Reviews

In order to ensure that adequate documentation exists for all of EIA's surveys, a program is in place to determine whether documentation exists for each EIA data system. The "Big Three" pieces of core documentation are checked. These are:

- Data User's Manual
- Operations Manual
- Program Maintenance Manual.

The review checks to see if the documentation exists. It takes an inventory to see if all the required pieces are there, and if the pieces generally are what they are supposed to be. This allows EIA to be sure that all its systems are documented. If documentation is found missing, survey managers are required to provide a date when it will be completed.

Quality Audits

The most comprehensive EIA program for checking standards compliance is the quality audit program. The purpose of the program is to determine whether EIA's data systems are basically sound and capable of producing good quality data. It concentrates on three major areas:

- Survey Processing
- Documentation
- Standards Compliance.

In survey processing, both manual and automated procedures are reviewed in detail. Mailout, forms receipt control, data entry, manual and automated editing, nonresponse followup, edit flag reconciliation, and imputation are all examined. Computer code is analyzed and tested to make sure it is effective. A checklist is used to make sure that each area of survey operations is covered, and that each audited system receives the same treatment.

The second major area is documentation. All available documentation is reviewed with special emphasis on the Data User's, Operations, and Program Maintenance Manuals. Again a checklist is used to ensure comprehensive coverage. The difference between this review and the documentation review mentioned earlier is primarily one of scope. At the start of each audit the documentation is obtained, as well as access to the computer code to run the system. The documentation is reviewed in detail and compared to the computer code. Interviews are also conducted with survey staff to find out how they operate the system. All three sources are checked for consistency. When discrepancies are found, followup interviews are done to determine what is really happening.

Finally, the system is checked against each EIA standard for compliance. Again a checklist is used and any deviations are noted.

Once a comprehensive picture of the system is obtained, a report is written evaluating the system and its compliance with standards. If unsound procedures or problems that could contribute to inaccuracies in data are found, recommendations are made. Each recommendation is made in writing as part of the audit, is signed-off by the office responsible for the survey, and is approved

by the Administrator of EIA. Each office is held accountable for implementing the recommendations by the date specified in the audit. The Office of Statistical Standards is responsible for checking to see that the recommendations have been implemented. This is done through a tracking system and an annual followup study.

IMPACT OF STANDARDS ON SURVEY QUALITY

Measures of Survey Quality

To assess the impact of standards on survey quality some yardstick to measure progress is needed. EIA uses measures that are tied back to our original objectives. They are:

- Accuracy and Reliability
- Adequate Procedures for Detecting and Reducing Errors
- Efficient Processing Procedures
- Clear Data Presentation
- User Confidence.

Impact of Standards on Survey Quality

Using these measures, what impact have standards had on survey quality? There are three areas where standards have made a contribution:

- Documentation has gotten better.
- Publications are more consistent and the data in them are more clearly displayed.
- Data are less frequently called into question.

Are standards responsible? The answer is that they are only partially responsible. Standards would not have been effective by themselves. What was required were parallel programs of:

- Enforcement
- Education
- Evaluation.

This is the key point to understanding the standards program at EIA. In order for the program to be effective, it had to be combined with these other elements. Standards were one part of an overall effort to bring about change at the agency.

The enforcement program has been described in some detail in this paper. EIA also has a relatively new Technical Workshop Program. Periodic workshops and seminars are held that describe new technologies, as well as applications of tried and true methods. The workshops are conducted by outside experts and EIA staff, and have been successful at informing survey practitioners about ways of improving their surveys, and stimulating the exchange of information between offices.

Finally, survey processes and data must be constantly evaluated. EIA has an active program of data evaluation including reports on specific data series called "An Assessment of the Quality and Accuracy of Selected EIA Data Series." A new program of quality control audits linking quality control activities with data accuracy has begun. These data evaluations feed back into the standards program leading to changes in the standards and to improved survey quality.

SUMMARY

This paper described the state of statistical affairs at EIA when it was formed. There was a heterogeneous organizational culture in the agency. There has been a change in the statistical culture at EIA. Standards have played a large part in this regard. There is more concern about quality. But standards alone did not do the job. They never can. Any standards program that has been introduced for the reasons it was at EIA must be accompanied by a rigorous enforcement program. If all survey managers believed that these things should be done, then standards would be unnecessary. Enforcement puts practitioners on notice that there are minimum requirements, and that the agency is serious about following them. Of equal importance is education. No enforcement program can get people to change their attitudes about the way surveys are run. Standards are developed to address a problem. Following the letter of a standard without regard for its intent dooms any efforts in quality improvement to failure. One will have "shadow compliance," all form and no substance. Edits will be tracked but followup of edit flags will be superficial. Performance statistics will be collected but never acted upon. Documentation will be created and then put on the shelf until the next time it is audited. Without a serious commitment to staff training, formal and on the job, standards may be followed, but the organizational culture will remain the same.

The standards program at EIA has enjoyed some measure of success. But this success has not come easily. It took time and staff resources, both for the development of the standards and for the educational, enforcement, and evaluation activities that accompanied it. The standards program could not have succeeded without these parallel programs and without the commitment at EIA that it would succeed.