Achieving Information Quality via Continuous Quality Improvement[1]

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Executive Summary: This paper focuses on a recent initiative to redesign the Petroleum Marketing Program (PMP), using a hybrid framework for information quality and data quality and the Continuous Quality Improvement (CQI) cycle. A CQI cycle was implemented to achieve data and information quality in the Office of Petroleum and Biofuels Statistics (PBS) of the U.S. Energy Information Administration (EIA). The CQI cycle consists of four stages - plan, implement, monitor and evaluate.

When designing a new survey or program, one starts with the planning phase, however for existing programs the first step is the evaluation phase. An evaluation was conducted in 2011 of the PMP to identify and select recommendations to implement in the 2013 PMP during the Office of Management and Budget (OMB) forms clearance process. Many of the recommendations identified from several evaluations have been adopted during the planning phase, in preparation for implementation of the program in 2013. Additional recommendations may be implemented in the future as the CQI process continues from one survey cycle to the next one.

PBS manages two information data collections – the PMP and the Petroleum Supply Program (PSP). Combined these two programs provide weekly, monthly and annual statistics pertaining to petroleum supply, demand, and price, including prices for crude oil and petroleum products in the United States.

A comprehensive review of the entire program is conducted every three years during the Office of Management and Budget (OMB) forms clearance process. This process started with compiling, reviewing, evaluating and prioritizing recommendations intended to enhance information quality and data quality. A review was conducted of recent and previous reports of the program and associated surveys, both internal and external. The review included reports from outreach activities with internal and external customers, internal self-assessments by survey managers and external evaluations of the program, including peer review of the survey questionnaires.

A hybrid framework combining existing information quality and data quality frameworks was used to sort recommendations into several dimensions of quality related to the program, to the products and to the surveys. OMB's Information Quality Guidelines was used to sort recommendations pertaining to the program. The seven dimensions of information quality introduced by Gordon Brackstone from Statistics Canada were used to sort recommendations pertaining to publications. The framework from OMB's Statistical Policy Working Paper Number 31, Measuring and Reporting Sources of Error in Surveys, was used to sort recommendations pertaining to sampling and nonsampling errors.

A team of survey managers, methodologists and contractors evaluated which of the 200 potential recommendations to adopt, of which many would have been adopted had resources not been a constraint. Forty of the recommendations were adopted, many of which involved modifications to the survey questionnaire and instructions to enhance consistency across surveys in the program.

There are several challenges when planning and implementing the 2013 PMP. One challenge involves integrating ten surveys into a comprehensive program and another integrating this program with the PSP which provides an overview of the petroleum flow in the United States. Another challenge is providing publications for a variety of customers - policy makers and analysts with federal/state/local government agencies, petroleum and other industries, along with the media and public. These customers use select data for a variety of purposes.

Consequently, a new product proposed for 2013 is a Product Profile for each PBS publication. A separate Product Profile will supplement the existing technical notes in the publications. The Product Profile will provide additional documentation regarding sources of data and their limitations, survey methods and appropriate uses.

[1] The analysis and conclusions contained in this paper are those of the author(s) and do not represent the official position of the U.S. Energy Information Administration (EIA) or the U.S. Department of Energy.

Text Box 1: Overview of Surveys in the Petroleum Marketing Program

The Petroleum Marketing Family of Surveys consists of three sub-families of surveys and a sampling frame. The geographic coverage for these surveys is the United States (US), which in most cases includes the 50 states and the District of Columbia. As stated below the geographic coverage in a few cases also includes the U.S. territories and possession. All of the surveys in the program are mandatory. The monthly surveys are a census whereas the weekly and annual are sample surveys.

The first sub-family is composed of the following three monthly surveys which collect data on crude oil acquisition costs and the volumes acquired.

- The EIA-182, "Monthly Domestic Crude Oil First Purchase Report," collects data from firms which take or retain ownership of domestic crude oil leaving the lease on which it was produced within the US including the Outer Continental Shelf.
- The EIA-856, "Monthly Foreign Crude Oil Acquisition Report," is a census of two populations: those firms that reported data as of June 1982 on the Transfer Pricing Report (ERA-51) and those firms acquiring more than 500,000 barrels of foreign crude oil during the reporting month for importation to the US and its territories and possessions.
- The EIA-14, "Refiners' Monthly Cost Report," collects data from firms who own or control refining operations in the United States and its territories/possessions.

The second sub-family is composed of the following monthly and annual surveys which collect data on petroleum product sales volumes and prices for the refined products.

- The EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," collects data from firms who directly or indirectly control a refinery or a gas plant located in the United States. Firms report by state on their total sales volume (in thousands of gallons) and average price per gallon (excluding sales taxes) for each petroleum product by sales type by user category.
- The EIA-782C, "Monthly Report of Prime Supplier Sales of Petroleum Products Sold for Local Consumption," collects data from petroleum product suppliers who make the first sale of specified petroleum products and then deliver that product into a state for consumption in that state.
- The EIA-821, "Annual Fuel Oil and Kerosene Sales Report," collects data from companies that deliver or sell to end users distillate and/or residual fuel oils or kerosene. The data being reported are average prices, which are computed using volume measures derived from the survey itself once a year.

Firms report sales volume by state and product type (motor gasoline, diesel fuel oil, distillates, residual fuel oil, and other product types), and in a few cases by energy end use (residential, commercial, industrial, and other categories).

The third sub-family is composed of the following three weekly surveys which collect price data for end-users of refined petroleum products where the reporting unit tends to be the individual outlets.

- The EIA-877, "Winter Heating Fuels Telephone Survey," is a sample survey of No. 2 heating oil and propane dealers in Eastern and Midwestern states. This survey is conducted from October 1 to March 15.
- The EIA-878, "Motor Gasoline Price Survey," is a sample survey of retail outlets selling motor gasoline.
- The EIA-888, "On-Highway Diesel Fuel Price Survey," is a sample survey by telephone of retail motor vehicle diesel fuel outlets.

Firms report weekly prices of sales of select petroleum products by state and product type on these surveys. The data reported on these weekly surveys are point-in-time estimates.

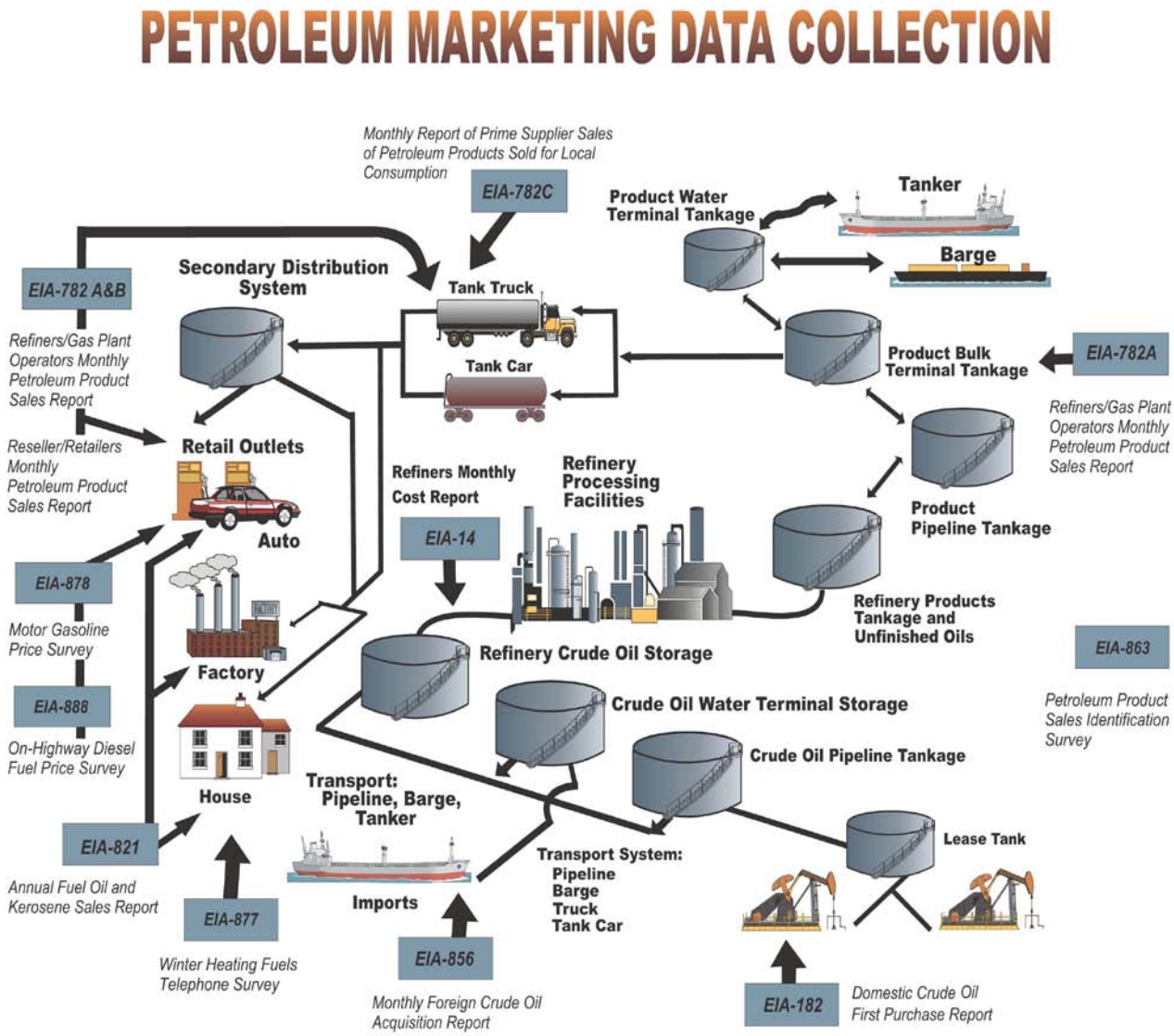
The EIA-863, "Petroleum Product Sales Identification Survey" is a census which occurs every four years and is used to build the frame for the EIA-821, the EIA-877, EIA-878, and EIA-888. The frame consists of resellers and retailers of No. 2 distillate, propane, and residual fuel oil, motor gasoline, and other select petroleum products.

These surveys in combination are used to monitor the petroleum volumes and prices as the commodity moves through the various stages from production/importation of the raw material to refining to create the finished products to transfer/distribution from the refiner to the retail outlets to sales to ultimate consumers.

Introduction: The Petroleum Marketing Program (PMP) collects and publishes weekly, monthly and annual data on the characteristics, structure, and efficiency of petroleum markets at the national, regional, and state levels. These data are published in the *Monthly Energy Review (MER)*, *Annual Energy Review (AER)*, *Petroleum Marketing Monthly (PMM)*, *Gasoline and Diesel Fuel Update (GDFU)* and other web publications and analysis.

The data integrated into these publications is compiled from ten surveys described in order of their place in the market chain in Text Box 1. A schematic displaying integration of the Petroleum Marketing Program data collection activities is provided below in Diagram 1. This displays the petroleum flow from imports and domestic reserves to refineries, from the refineries through the pipeline, barges or tankers to bulk terminal storage, and from the bulk terminals along to tanker trucks that deliver gasoline to retailers, resellers and outlets where consumers purchase gasoline. This diagram also displays the challenge of collecting data regarding crude oil and petroleum products from a variety of respondents, including importers, refineries, retailers, resellers and outlets that market gasoline and other products.

Diagram 1: Petroleum Marketing Data Collection



Source: EIA

Another way to display the relationship between Suppliers (respondents), Inputs (data collection), Processes (replaced with frequency), Outputs (data dissemination) and Customers is a modified SIPOC diagram. This diagram is commonly used by quality improvement teams when seeking to understand complex relationships among components of a system. Diagram 2 is a modified SIPOC diagram of the Petroleum Marketing Program.

Diagram 2: Modified SIPOC Diagram of Petroleum Marketing Program

Respondents	Data Collection	Frequency	Data Dissemination	Customers
Importers	EIA-821	Annually	Annual,	Congress
Petroleum refineries	EIA-14	Monthly	Monthly and	Fed / state / local government
Gas plants	EIA-182	Monthly	Weekly	Energy analysts
Bulk terminals	EIA-782A/C	Monthly	Publications	Financial analysts
Pipelines	EIA-821	Monthly		Media/public
Tanks/tankers/barges/ Tank cars/trucks	EIA-856	Monthly		Researchers
	EIA-877	Weekly		
Retailers and Resellers	EIA-878	Weekly		
	EIA-888	Weekly		

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Alternative Frameworks for Information and Data Quality: Several alternative frameworks of Information and Data Quality were considered when evaluating the Petroleum Marketing Program. Information quality frameworks tend to focus on principles or standards for information products, often web publications. By contrast data quality models focus on survey methods and sources of errors, both sampling and nonsampling errors – coverage, measurement, nonresponse and data processing. Other hybrid frameworks have been adopted by other National Statistical Organizations to enhance both data and information quality.

The OMB and DOE Quality Guidelines seek to ensure the integrity, objectivity, utility, transparency and reproducibility of information products in order to establish and maintain creditability with data users. In 2002, both the OMB and the U.S. Department of Energy (DOE) published Information Quality Guidelines. OMB published final Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies published in final form in 2002. These published guidelines were issued pursuant to Section 515 of the Treasury and General Appropriations Act for Public Law 106-554; 5658. As part of the final OMB guidance, Federal agencies were directed to issue guidelines for ensuring and maximizing the quality of information they disseminate.

The Office of the Chief Information Office for the DOE issued "Final Report Implementing Office of Management and Budget Information Dissemination Quality Guidelines" that applied to all DOE components, including EIA.

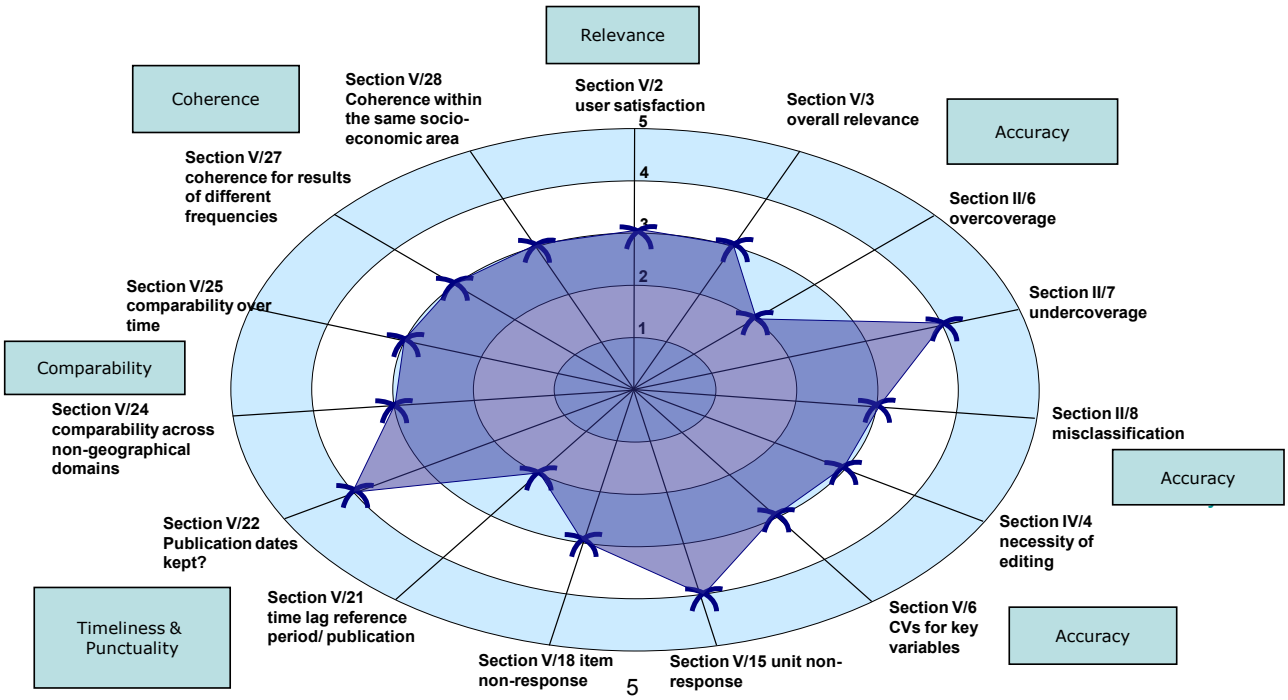
These guidelines describe the policy and procedures to ensure and maximize the quality, utility, objectivity, and integrity of the information that DOE disseminates to members of the public.

By contrast, a data quality framework focuses on accuracy and reliability of the survey operations, i.e., the production cycle, rather than the information products per se. This framework focuses on seeking to diagnose, to measure, and either to prevent and to treat both sampling and nonsampling errors. In order to conduct an assessment of total survey error it is essential to understand the survey procedures, including relationships among survey procedures (e.g., feedback loops). EIA has used these recommendations to monitor survey quality, both by survey and program managers. The data quality framework, made popular by Robert Groves, was used to develop recommendations in OMB's Statistical Policy Working Paper Number 31, *Measuring and Reporting Sources of Error in Surveys*. Establishing quality controls during the data collection, processing and dissemination process are essential to ensure the accuracy and reliable of the survey data.

Many of the National Statistical Organizations in Europe and Canada have worked to developed frameworks for improving quality of their products and survey systems. Gordon Brackstone, from Statistics Canada, identified seven dimensions for information quality and this framework serves as the foundation of Statistics Canada's Quality Assurance Framework. This framework focuses on the user's experience and includes the following dimensions of information quality: accessibility, accuracy, consistency, coherence, interpretability, relevance and timeliness.

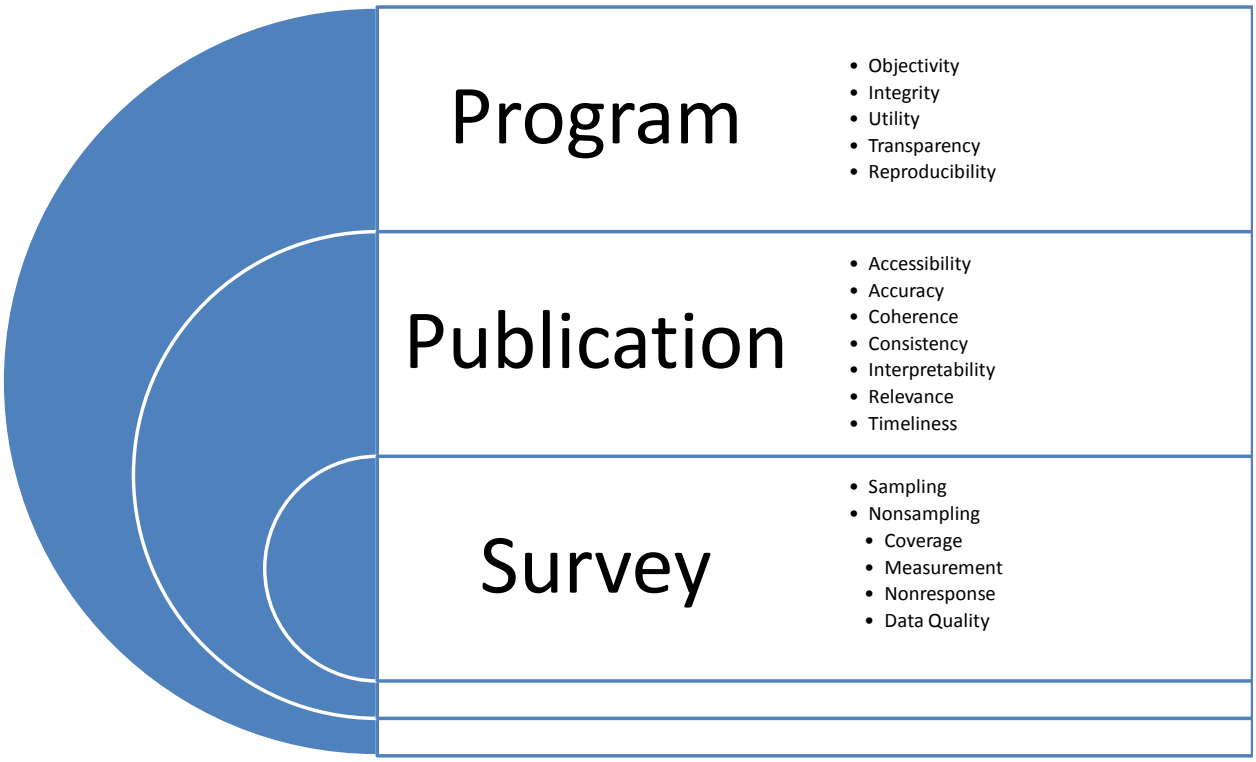
These two frameworks provide a hybrid of information quality and data quality frameworks, focusing typically on accuracy, coherence, comparability, relevance, and timeliness as displayed in Diagram 3 from Eurostat's Development Self-Assessment Program (DESAP).[1]

Development of a Self-Assessment Program (DESAP) at Eurostat (Cobweb Diagram)



A hybrid framework integrating dimensions from these frameworks of data and information quality was used during the recent evaluation of the PMP. The recommendations were sorted into dimensions of information and data quality of the program, to the products, or to the surveys. This integrated principles from the OMB and DOE Information Quality Guidelines, Statistics Canada, and OMB's Statistical Policy Working Paper Number 31. Diagram 4 displays the tree diagram of the dimensions of quality.

Diagram 4: Hybrid Framework of Information and Data Quality



Application of Hybrid Framework for Information and Data Quality: This hybrid framework was selected to evaluate the PMP. A few of the recommendations applied to the entire program, others to publications and others to survey processes. There is overlap among these dimensions, not displayed in Diagram 4, yet it was possible to sort all of the recommendations into one of these dimensions based on whether it pertained to a survey (input), a publication (output) or the entire program (system). Sorting the recommendations into these dimensions was useful for establishing priorities among the 200 recommendations based on available resources.

Achieving information and data quality is critical to the mission of EIA and has become increasing important in recent years to meet the mission of EIA. The mission of EIA is to collect, analyze, and disseminate independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. The PBS products are used by customers, including public and private analysts and policymakers to monitor the current status and trends of petroleum supply, consumption and price in the United States.[2]

EIA disseminates data products, analyses, and reports primarily through the Internet. Major users of EIA's work products include the Congress, Federal, State and local government, financial industry, new media and the public, researchers and academia. In recent years, the information quality framework has provided guidance and standards for dissemination of information products, with increased attention to web publications as paper publications have been eliminated or discontinued.

In response to the previously mentioned OMB and DOE guidelines, EIA, an independent statistical agency of the DOE, made revisions to agency standards and guidelines to emphasize a framework of information quality. The information quality framework focuses on the quality of information published rather than solely on data quality.

EIA revised many of the statistical standards and operational guidance to identify policies and procedures to optimize information quality. Many of these standards followed the guidance provided in OMB's Statistical Policy Working Papers (SPWP), including SPWP Number 15, Quality in Establishment Surveys, and SPWP Number 31, Measuring and Reporting Sources of Error in Surveys.

EIA utilized the following definitions pertaining to quality and influential information in order to revise EIA standards. Influential when used in DOE means information: (1) that is subject to embargo until the date of its dissemination by the Department or DOE Element disseminating the information because of potential market effects; (2) that is the basis for a DOE action that may result in an annual effect on the economy of $100 million or more; or (3) that is designated by a DOE Element as "influential".

- Objectivity means ensuring that the substance of the information is accurate, reliable, and unbiased, and the information is presented in an accurate, clear, complete, and unbiased manner.
- Integrity refers to the security of information from unauthorized access or revision to ensure that the information is not compromised through corruption or falsification.
- Utility refers to the usefulness of the information to its intended users. Influential scientific, financial, or statistical information shall include a high degree of transparency to facilitate its reproducibility.
- Transparency means clear and concise information on such topics as information sources, survey and analytical methods, accuracy, and reliability.
- Reproducibility means capability of being substantially reproduced, subject to an acceptable degree of imprecision. With respect to analytical results, "capable of being substantially reproduced" means that independent analysis of the original or supporting data using identical methods would generate similar analytic results, subject to an acceptable degree of imprecision or error.[3]

In order to ensure objectivity of the information, products released by EIA surveys are conducted using methodologies that are consistent with generally accepted professional standards. This covers all aspects of survey activities including frame design and development, questionnaire design and testing; data collection activities, imputation of missing data, sample design, estimation and variance estimates. In addition, EIA provides explanatory notes and survey documentation, as appropriate, for information products.

In order to ensure integrity, EIA employs a group of information technology controls and data handling procedures that provide appropriate safeguards against unauthorized access to its data systems.

In order to ensure the utility of information products, EIA establishes and adheres to data release schedules to ensure high quality information is released in a timely manner and users have equal access, and provides information products in ways that are accessible to a broad range of users. A few of the efforts to ensure the utility of information products for customers include:

- Establishing and adhering to schedules designed to ensure quality information is released in a timely manner
- Providing information products in ways accessible to a broad range of information users
- Providing explanatory materials to assist users in understanding and interpreting the information
- Analyzing customers' information requirements by use of specific tools, such as customer surveys
- Assessing the products themselves to help ensure timeliness and relevance
- Holding discussions with policymakers and analysts in Congress, the Executive Branch, and State and local governments
- Consulting with data providers and data users (e.g., solicitation of comments through the *Federal Register*)
- Conducting cognitive interviews and focus groups to evaluate information collection and dissemination methods and instruments
- Conducting other outreach activities to adapt EIA's information programs as appropriate
- Sponsoring the evaluation of EIA programs and information products by the American Statistical Association Committee on Energy Statistics. [4]

In order to ensure transparency and reproducibility, EIA requires documentation of survey methods which is included in explanatory notes (data sources, survey and analytical methods, and summary of data quality) for most information products. Standards also require archiving input and output data published in information products. Following announcement of the OMB Information Quality Guidelines in 2002, OMB developed and published Standards and Guidelines for Statistical Surveys. These standards include guidelines for the following survey procedures:

- Development of concepts, methods, and design
- Collection of data
- Processing and editing of data
- Production of estimates and projections
- Data analysis
- Review procedures
- Dissemination of Information Products[5]

EIA information products contain technical notes which provide a description of select survey methods and performance measures for sampling and nonsampling errors. These technical notes provide customers with information about survey methods and data quality, including a description of sampling and nonsampling errors. The technical notes are intended to assist users in understanding the sources and limitations of the data.

Both qualitative and quantitative techniques are used to evaluate energy programs and survey processes. These evaluations use several techniques, including interviews, customer surveys, focus groups, facilitated group techniques, evaluated customer's needs. These outreach activities involved internal and external customers, and both formally and informal processes. Each of these activities solicited feedback regarding the PMP and associated surveys. As a result of these efforts, several recommendations were adopted for the 2013 PMP.

EIA conducts an annual customer survey, organizes workshops and meetings and conducts other outreach activities to obtain informal feedback regarding information products. Recent workshops were held with customers and stakeholders including the 2009 State Energy Data (SED) Workshop, the 2010 Energy and Financial Markets Initiative, and the 2011 National Petroleum Council meeting.

For example, the 2009 SED workshop solicited recommendations regarding data needs from State Energy Offices representatives. Their recommendations were integrated into a report to Congress, the 2009 State Energy Data Needs Assessment. This report responded to Section 805(d) of the Energy Independence and Security Act of 2007 (EISA), Public Law 110-140. One of the requirements of this law was to ensure the quality, comparability, and scope of State energy data. This included data on energy production and consumption by product and sector and renewable and alternative sources, as well as data required to provide a comprehensive, accurate energy profile at the State level. This report and a revised report issued in 2011 contained an overview and assessment EIA's energy programs and a plan to address the existing data needs. Recommendations from this and other reports were among sources used to identify recommendations to consider during the redesign of the 2013 PMP.

The American Statistical Association (ASA) Committee on Energy Statistics meets bi-annually to provide technical advice regarding EIA's energy programs, including the Petroleum Marketing Program and associated surveys. The committee members, many of whom are statisticians and energy analysts, also provide consultant to the programs.

In order to obtain formal comments regarding our programs from data users and respondents EIA publishes a Federal Register Notices (FRN). The FRN is required by OMB during the forms clearance process to obtain comments regarding information collection activities. These comments are weighed when redesigning a program, as any change to the program will impact both data users and respondents, while seeking to balance between their needs.

In advance of redesign of the 2013 PMP, the PBS also conducted facilitated meetings with internal customers and stakeholders, as the data from the Petroleum Marketing Programs is integrated with other data into EIA publications and analysis conducted by other offices. These information products include the *Monthly Energy Review (MER),*

Annual Energy Review (AER), Annual Energy Outlook (AEO), International Energy Outlook (IEO), and Short-term Energy Outlook (STEO).

In recent years, other initiatives, including the quality self-assessments and survey and program document evaluation program, have compiled metrics on sources of error and provided more comprehensive and consistent documentation on survey methodology for the Petroleum Marketing and other EIA energy programs. The first initiatives sought to measure the magnitude of survey errors and the second one to enhance document about survey methodology.

A quality assessment was conducted of all of surveys, including surveys in both the PMP and PSP in 2006. Survey methodologists from the Statistics and Methods Group developed and conducted interviews with survey managers to prepare these quality self-assessments. Each of these reports contained summary information regarding survey methods, select measures regarding data quality, and identified what the survey manager determined was going well and potential improvements. The quality measures compiled included frame activity (e.g. number of births, deaths, and mergers), coverage rate, percent by mode of data collection, response rate by unit and volume, percent of forms failing one or more edits, relative standard error (if applicable) for key variables, difference between release date of publication and end of reference period, and revision of published key aggregate variable (percent change from first published to final release).

Another previous initiative was development of program and survey templates to document and evaluated the EIA programs and surveys. A survey template was developed and used by a contractor to document and evaluate the PMP and associated surveys. The survey template compiled information on survey objectives, survey preparations (including pretests), sample design, data collection, data processing, estimation, and errors, both sampling and nonsampling errors. A separate report was prepared for each of the surveys. Likewise a program template was developed and used to document the program, integration information from the survey methodology reports.[6]

In preparation for planning the 2013 PMP, four evaluations were conducted in 2011. The first evaluation involved interviews with survey staff and contractors to identify potential enhancements to the program through updates to the frame maintenance, survey design, sampling and estimation, and other procedures. The second evaluation, conducted by survey methodologists in the Office of Survey Development and Statistical Integration, interviewed survey managers and data analysts. This evaluation involved early-stage scoping interviews that used semi-structure protocols to understand substantive issues from the subject matters' point of view. The third evaluation involved interviews with respondents to identify any other data quality concerns while corroborating issues identified in the previous two evaluations. The semi-structured protocol used for these interviews focused primarily on efficient form design to improve data quality, reduce respondent burden, and improve process efficiency. A final evaluation involved a peer review of the surveys conducted by a survey methodologist who provided additional recommendations to increase response rates and consistency across the surveys. These evaluations were conducted in advance of planning the 2013 PMP.

The recommendations from these numerous internal and external evaluations and suggestions from customers during outreach activities were compiled, reviewed and prioritized in advance of redesign the 2013 PMP. These recommendations were reviewed by a team of program and survey managers, methodologists, and subject matter experts during the evaluation phase for OMB Forms Clearance.

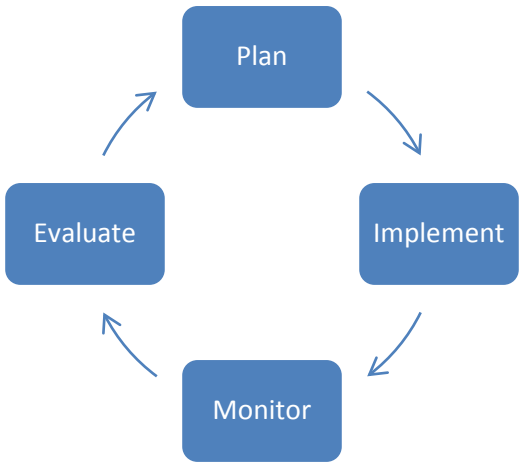
Continuous Quality Improvement (CQI): The CQI cycle is an iterative process. This cycle, displayed in diagram 5, involves four phases. This management process is useful in seeking to achieve both information and data quality. This approach can be used either from one survey cycle to the next or during the OMB forms clearance process, every three years, to modify survey operations and to introduce or revise existing information products.

The CQI cycle has been used by engineers to evaluate industrial process for over 50 years. The idea of adopting these techniques to survey processes was originally introduced by W. Edward Deming in the 1940s at the Census Bureau.[7] In recent years the process of continuous quality improvement has been adopted by other National Statistical Organizations, including Statistic Canada which utilized this process in their Quality Assurance Framework introduced in 2002.[8]

Deming and others have pioneered and applied systems thinking and techniques to information processes in order to manage, to control and to improve surveys and information products. Deming builds upon systems dynamics thinking and techniques made popular by the Massachusetts Institute of Technology in his 14-point framework for quality improvement. He applied these techniques, commonly used for industrial processes, to information processes. [9] This approach is fact-based and utilizes systems techniques to measure outputs of process to determine consistency of the process, while seeking to improve the quality of the data. There are several variations on the CQI process although it is often displayed as a process of Plan-Do-Monitor-Evaluate as shown in Diagram 5.

The CQI cycle is useful when seeking to design or redesign and develop either a new survey or a new survey process. When designing a new survey or process one starts with the planning phase whereas when redesigning an existing process, survey and program, the process begins with evaluation phase of the cycle.

Diagram 5: Continuous Quality Improvement Cycle



On the Road to Achieving Data and Information Quality: There are numerous challenges to achieving data and information quality when planning and implementing a survey program, including the 2013 PMP. Some of our current challenges include:

- Ensure consistency and coherence across surveys and publications
- Redesign surveys and programs to ensure they remain relevant to changes in the industry
- Understanding and meeting the needs of a diverse set of customers
- Educating customers and stakeholders regarding the limitations and appropriates uses of the data.
- Integrating data, including data from numerous surveys, when producing information products
- Introduction of new applications to perform functions of data collection, data processing and data dissemination

Many of the recommendations reviewed when evaluating options and planning for implementation of the 2013 PMP addressed these challenges. Of the over 200 recommendations proposed, eventually more than 40 of the recommendations were adopted by the team which consisted of the office director, team leader, survey managers, survey staff, and internal data users and stakeholders.

One of the recommendations adopted involved eliminating data elements collected on three surveys. This decision was the consequence of recent regulation issued by the U.S. Environmental Protection Agency (EPA). The EPA announced the Heavy-Duty Highway Diesel rule (2007 Highway Rule) in 2001 and issued the regulation, the Clean Diesel Trucks, Buses, and Fuel: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements (the "2007 Heavy-Duty Highway Rule"), in 2007. This rule prohibits the sale of low sulfur No. 2 diesel fuel with sulfur content of greater than 15 and less than parts per million (ppm) or equal to 500 ppm for on-highway use. This change in industry resulted in revisions to the three of the survey which collected on-highway diesel fuel by sulfur category, the EIA-782A, the EIA-821, and the EIA-888.

Several recommendations were adopted to enhance the consistency and coherence across the surveys in the PMP and across the two PBS programs. One of the recommendations adopted was to enhance the consistency in the definitions across the surveys in the PMP, between the Petroleum Supply and Petroleum Marketing programs, and with the definitions in the EIA Glossary. The differences in the definitions evolved over time, as new items were added to surveys and terms from over 70 surveys were integrated into the EIA Glossary. A survey methodologist identified discrepancies among the definitions across the surveys, across the two programs, and between PBS and the EIA Glossary. Many of the definitions were revised to enhance consistency, while in other cases they were not because the definition required differed depending on the purpose of the survey and program.

2013 Initiative to Develop Product Profiles for Publications: One of the major challenges is providing guidance to customers about the appropriate use and limitations of the data. Hence, one of the recommendations adopted for 2013 is to design and develop product profiles for publications in the PMP, starting with the weekly Gasoline and Diesel Fuel Update**.** This web publication contains information on trends of gasoline and on-highly diesel fuel price for the United States and for the Petroleum Administration for Defense Districts.

The purpose of these product profiles is to provide customers with information they can use to evaluate the appropriate uses of the data based on data and information quality. These product profiles will provide an overview on the PBS publication, a description of sources of data and survey methods, and a discussion of sampling and nonsampling error. Recommendations from OMB's Statistical Policy Working Paper Number 31: Measuring and Reporting Sources of Error in Surveys and Standards and Guidelines for Statistical Surveys will be used to prepare the product profiles. These profiles are intended to provide information regarding survey methods and sources of data error, beyond what is currently provided in the technical notes of the publications.

These reports will include examples to illustrate and to guide users on the appropriate uses of the data. Real examples will guide policy maker, industry and financial analysts, the media and public about the proper interpretation of the data. Appendixes will provide more advance users with additional information and applications.

References

Bournazian, Jake, "Revising Statistical Standards To Keep Pace With The Web," Vancouver, British Columbia, August 1, 2010.

Brackstone, Gordon, "Managing Data Quality in a Statistical Agency," *Survey Methodology*, 25, p. 139-149, 1999.

Broene, Tom, "Survey Quality Assessments at EIA," proceedings from the Fall meeting of American Statistical Association Committee on Energy Statistics, Washington, D.C., October 20, 2005.

Cox, Brenda, and Nancy Kirkendall, "Developing a Survey Program Evaluation Process," Washington, D.C., October 28, 2004.

Cox, Brenda, "Petroleum Marketing Program and Survey Documentation and Evaluation" (internal EIA report), Washington, D.C., 2007.

Deming, W. Edward, Out of Crisis, Massachusetts Institute of Technology, Center for Advanced Engineering Study, Cambridge, Massachusetts, 1986.

Department of Energy (2002), "Final Report Implementing Office of Management and Budget Information Dissemination Quality Guidelines," Federal Register Vol. 67, No. 194, p. 62446, October 7, 2002, Washington, D.C.

Ellerman, et.al., Challenges, Choices, Changes: An External Study of the Energy Information Administration, EIA, Washington, D.C., May 15, 2006.

Energy Information Administration (EIA), EIA's Information Quality Guidelines, EIA, Washington, D.C., 2012

EIA, EIA's Standard Manual, EIA, Washington, D.C., March 10, 2012.

EIA, EIA's Strategic Plan, EIA, Washington, D.C., 2011

EIA, "Findings and Recommendations from Internal Early-Stage Scoping for the Petroleum Marketing and Supply Forms" (internal EIA report), Office of Survey Development and Statistical Integration, EIA, Washington, D.C., June 8, 2011.

EIA, State Energy Data Needs Assessment, EIA, Washington, D.C., January 2009.

English, Larry, Improving Data Warehouse and Business Information Quality: Methods for Reducing Costs and Increasing Profits, John Wiley and Sons, Inc., New York, 1999.

Eurostat, *European Statistic Systems Code of Practices: Self Assessment Questionnaire (Version 3.1)*, Deputy Director General, Unit 0-2: Statistical governance, quality and evaluation of the European Commission, Luxembourg, March 8, 2007.

Eurostat, ESS Handbook for Quality Reports, Office for Official Publications of the European Communities, Luxembourg, 2009.

Eurostat, European Statistics Code of Practice, European Commission, Luxembourg, September 28, 2011.

Government Printing Office (GPO), Section 805(d) of the Energy Independence and Security Act of 2007 (EISA), Public Law 110-140, GPO, Washington, D.C., December 19, 2007.
Grove, Robert M., Survey Errors and Survey Costs, John Wiley and Sons, New York, 1989.

Office of Management and Budget (OMB), "Federal Statistical Organizations' Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Disseminated Information," Federal Register Vol. 67, No. 107, page 38467, Washington, D.C., June 4, 2002.

OMB (1988), Federal Committee on Statistical Methodology Statistical Policy Working Paper Number 15: Quality in Establishment Surveys," Washington, D.C., July, 1988.

OMB (2001), Federal Committee on Statistical Methodology, Statistical Policy Working Paper, Number 31: Measuring and Reporting Sources of Error in Surveys, Washington, D.C., July, 2001.

OMB, "Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies," Federal Register Vol. 67 No. 8452, Washington, D.C., February 22, 2002.

OMB, Paperwork Reduction Act of 1995, P.L. 10413, Federal Register Vo. 60, No. 167, page 44978, Washington, D.C., August 29, 1995.

OMB, Standards and Guidelines for Statistical Surveys, OMB, Washington, D.C., September 2006.

Scherkenbach, William W., Deming's Road to Continual Improvement, SPC Press, Knoxville, Tennessee, 1991.

Statistics Canada, Statistics Canada's Quality Assurance Framework, Statistics Canada, Canada, 2002.

Waugh, Shawna, Planning and Integration of EIA Survey Programs Proceedings of Survey Research Methods, American Statistical Association Conference, Toronto, Canada, 2006.

U.S. Environmental Protection Agency, the Clean Diesel Trucks, Buses, and Fuel: Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements (the "2007 Heavy-Duty Highway Rule"), Washington, D.C., 2007.

Z, Inc. Petroleum Marketing Data Quality Assurance Review (internal EIA report), Z, Inc., Silver Spring, MD, January 31, 2011.

Endnotes

[1] The DESAP diagram is from Eurostat's Development of a Self-Assessment Program and was presented by Tom Broene at the fall meeting of the American Statistical Association Committee on Energy Statistics on October 5, 2005.
[2] EIA's mission statement is available in EIA's Strategic Plan.
[3] The definitions for objectivity, integrity, utility, transparency, and reproducibility are from EIA's Information Quality Guidelines.
[4] The list of activities to ensure the utility of information products for customers is from EIA's Information Quality Guidelines.
[5] The list of survey procedures is from OMB's Surveys, September, 2006, p. 1-2.
[6] Brenda Cox and Nancy Kirkendall developed a template for survey and program documentation and evaluation and presented these templates at the fall meeting of ASA Committee on Energy Statistics on October 29, 2004.
[7] See Larry English's Improving Data Warehouse and Business Information Quality: Methods for Reducing Costs and Increasing Profits, p. 43.
[8] See Statistics Canada's Quality Assurance Framework, 2002.
[9] See English's Improving Data Warehouse and Business Information Quality: Methods for Reducing Costs and Increasing Profits, p. 337 – 399.