

**Supporting Statement for the
Monthly Survey of Industrial Electricity Use
(FR 2009a,b,c; OMB No. 7100-0057)**

Summary

The Board of Governors of the Federal Reserve, under delegated authority from the Office of Management and Budget (OMB), proposes to extend for three years, with minor revision, the Monthly Survey of Industrial Electricity Use (FR 2009a,b,c; OMB No. 7100-0057). The survey collects information on the volume of electric power delivered during the month to classes of industrial customers. Currently, there are three versions of the survey: the FR 2009a and FR 2009c collect information from 137 electric utilities, the FR 2009a in Standard Industrial Codes (SIC) codes and the FR 2009c in North American Industry Classification System (NAICS) codes. The FR 2009b collects information from 124 manufacturing and mining facilities that generate electric power for their own use (cogenerators). The surveys are voluntary.

The electric power data are used in deriving the Federal Reserve's monthly index of industrial production (IP) as well as for calculating the monthly estimates of electric power used by industry. The IP index is widely used by the Federal Reserve, other government agencies, businesses, and academia for economic analysis, policy review, and research. The national media report the monthly release of the index, a subject of considerable public interest. The IP index is also a basic component of the Federal Reserve's measures of capacity utilization, which are followed by similar groups of users. In addition, several Federal Reserve Banks use the electric power data for estimating regional production indexes. The industrial production, capacity utilization, and electric power statistics are published monthly in the Federal Reserve's G.17 statistical release "Industrial Production and Capacity Utilization."

The Federal Reserve proposes to continue using the FR 2009a report form. This report form was approved for discontinuance at the last report renewal owing to the industrial output index being revised to reflect the new North American Industry Classification System (NAICS) from the Standard Industrial Classification (SIC) codes. The FR 2009a would be completed only by respondents that choose to continue reporting in SIC codes. The Federal Reserve also proposes to reduce the authorized panel size to 160 utilities and 150 cogenerators to more accurately reflect the target population. A copy of the current reporting forms and instructions is attached.

Background and Justification

From its earliest days, the Federal Reserve has been interested in timely measures of economic activity. In 1919, it began to publish monthly indexes of the "physical volume" of domestic trade, which in the 1920s evolved into the monthly index of industrial production.¹ The index measures the output of the industrial sector of the economy, which is defined to include

1. *Industrial Production - 1986 Edition* (Board of Governors of the Federal Reserve System, 1986), chap. 9, contains a history of the IP Index through the mid-1980s. The index has continued to evolve since then, with modifications and improvements regularly described in articles published in the *Federal Reserve Bulletin*.

manufacturing, mining, and electric and gas utilities. Together with construction, the output of these major industry groups accounts for the bulk of the cyclical variation in the total output of the nation's economy.

An important aspect of the longstanding popularity of the IP index is its timeliness relative to other published statistics covering the industrial sector. Around the fifteenth day of each month, the Federal Reserve issues initial estimates of the industrial output of the previous month. These initial estimates are accompanied by revised estimates for the three preceding months. The revisions reflect the gradual availability of basic source data used to compile the monthly index.

The IP index, which currently comprises over 290 individual output series, is derived from three types of monthly source data. The first and preferred source is physical product data, which measures output in physical volume terms. More than half of the individual IP series are based on physical product data, and these series currently account for 50 percent of the value of the index. The physical product data are collected from a variety of government agencies and private industry associations.

The two other monthly data sources are the number of hours worked by production workers and electric power consumption, which measure physical inputs to production. For IP series derived from these data, output is estimated by exploiting stable relationships between the inputs and comprehensive output measures that are available only annually and with a two- or three-year lag. In compiling the monthly index, each of the input-based IP series is derived from either production worker hours or electric power use. The Bureau of Labor Statistics (BLS) provides the production worker-hour data.

The electric power data that the Federal Reserve uses in the construction of the IP index were collected on a Systemwide basis beginning in 1963 and introduced into the estimation procedures of the IP series in the 1971 comprehensive revision of the IP index.² Since then, electric power data have been used regularly to estimate key components of the index. Currently, 31 individual monthly IP series are based on electric power data, and these 31 series represent 19 percent of the value of the IP index. For these series, electric power use has proven to be a better indicator of output than production worker hours.

One reason that electric power use is superior to worker-hours data in estimating production is that some industries do not vary labor input to achieve short-run variation in output in response to expected or actual changes in demand. Rather, some firms adjust the volume of production by varying rates of machine operation, which changes electric power consumption,

2. The use of energy consumption as an indicator of production has a long history. See Flux, A.W., "Gleanings from the Census of Production," *Journal of the Royal Statistical Society*, vol. 76 (May 1913), pp. 8-16.

while keeping the amount of labor input relatively fixed.³ Thus, changes in electric power use may be more closely linked to output changes for industries with these adjustment patterns.

Technological and structural developments, such as automation, use of advanced technologies, and outsourcing of labor, suggest reasons why electric power may become an even more important indicator of industrial activity in the future. For many industries, electric power is now more heavily used as more steps in the production process have become more automated. Between 1972 and 1995, twelve of the twenty SIC two-digit manufacturing industry groups became more electricity intensive, that is, most manufacturing industries used more electricity to produce a unit of output in 1995 than they did in 1972. Moreover, while manufacturing establishments that use advanced technologies are more energy efficient, they rely proportionately more on electricity than on other forms of energy to power production processes.⁴ Last, estimating production from payroll information on worker hours has become more difficult as manufacturers have increasingly relied on temporary help supply agencies to provide labor used on routine production assembly lines.⁵ The trend toward adoption of advanced technologies and outsourcing of labor by manufacturers is likely to continue.

An advantage of the FR 2009a and c surveys is that they capture the activity of new manufacturing and mining establishments as soon as they obtain power from electric utilities, whereas other surveys are slower to detect and report new activity. Moreover, the amount of power used in manufacturing and mining, as measured by the FR 2009 surveys, is not affected by cogenerating industrial firms switching from cogenerator status to utility customer, or vice versa, when both the cogenerator and its utility are included in the FR 2009 panel.

The use of the electric power data is not limited to producing estimates of the IP series based entirely on electric power usage. The data are continually used to cross-validate the output estimates made using the physical-product data and worker-hours data. For each annual IP revision, the electric power data also are used to estimate the trend relationship between output and worker hours for IP series derived from the worker hour data.⁶ Furthermore, the electric power data also are useful in measuring industrial production at the regional level. Three Federal Reserve Banks currently prepare their own regional and state industrial production indexes. The electric power indexes, which appear in table 9 of the monthly G.17 statistical release, cover all industry groups for which the surveys provide data, including the specific data series for industry groups that are used directly in measuring industrial production.

3. See Matthey, J. and S. Strongin, "Factor Utilization and Margins for Adjusting Output: Evidence from a Panel of Manufacturing Plants," Federal Reserve Board FEDS working paper 95-12 (March 1995).

4. See Doms, M. and T. Dunne, "Energy Intensity, Electricity Consumption, and Advanced Manufacturing Technology Usage," *Journal of Technological Forecasting and Social Change*, October 1995.

5. See Segal, L. and D. Sullivan, "The Temporary Work Force," Federal Reserve Bank of Chicago *Economic Perspectives*, March/April 1995, Vol. 19 (2), pp. 2-19.

6. Similarly, for the monthly IP series derived from the electric power data, the trend relationship between output and electric power consumption is estimated using information on production worker hours.

Description of Information Collection

The Monthly Survey of Industrial Electricity Use consists of three forms, the FR 2009a, FR 2009b, and FR 2009c.

FR 2009a and FR 2009c. The FR 2009a collects the number of kilowatt hours of electric power delivered to firms in manufacturing and mining industries broken down by customer SIC code while the FR 2009c collects the same data broken down by customer NAICS code.⁷ In some cases where deregulation is proceeding slowly, power delivered is still obtained from sales data. However, utilities that were contacted by Federal Reserve all confirmed that all power delivered through the utilities' system were reflected in the reports received. On average, a completed FR 2009a report will contain 120 3-digit SIC subtotals, corresponding to the SIC categories of the customers to which the respondents sell. Each subtotal represents sales of electric power, in thousands of kilowatt hours, based on monthly meter readings. Reporting on the FR 2009c follows a similar pattern.⁸

Each utility reports data monthly in the format that is most convenient for the utility. Some of the utilities use the FR 2009 reporting form provided by the Federal Reserve; others submit computer printouts designed specifically to provide the data requested or computer printouts designed for the respondent's own use. The latter format is used most often. Because respondents typically process the data for internal use, responding to the FR 2009 usually involves only the small task of generating an additional printout. When problems are identified or data appear questionable, the Federal Reserve contact respondents by telephone.

FR 2009b. The FR 2009b collects, from manufacturing or mining firms that generate part or all of the electric power they used in production operations (cogenerators), the amount of power generated and used in the single code that applies to them. The FR 2009b reporting forms incorporate the NAICS standard. Cogenerators use the simpler reporting form since most of them utilize all of their power in one establishment. The Federal Reserve also handles follow-up communication with these respondents.

Proposed Revisions

7. Because there is not a one-to-one correlation between the NAICS and SIC codes, incorporating NAICS codes into the FR 2009a form would be difficult. This dual reporting form approach does not impose any added burden on the respondents as each uses only one of the forms.

8. While a majority of the utilities report data at the three-digit SIC level, there are many reporting patterns, with some respondents including some data at the four-digit SIC level and others reporting some or all of their data at the two-digit SIC level. The Federal Reserve now accepts four-digit data, so neither utilities nor Reserve Banks are required to aggregate the data to higher SIC levels before transmitting the data. The equivalent arrangement under the NAICS system is the ability to receive 4-digit or 5-digit NAICS codes.

In order to maintain as many respondents as possible without imposing undue burden, the Federal Reserve proposes to retain the FR 2009a report form. At the last renewal, the Federal Reserve proposed discontinuing the FR 2009a report form and replacing it with the FR 2009c report form. The FR 2009c is in the same format as the FR 2009a but uses NAICS instead of SIC codes. Respondents were given a two-year transition period to allow them time to switch to NAICS-coded data from SIC-coded data. These revisions were in response to the industrial production index being revised to reflect new reporting standards for economic indicators (NAICS codes). When the two-year transition timetable proved to be unrealistic for many respondents, the Federal Reserve extended the transition period for an additional year. However, many respondents have continued to have difficulty reporting in NAICS codes. The Federal Reserve Board is able to translate from SIC to NAICS codes for those that prefer reporting in SIC codes. Retaining the FR 2009a form does not impose any additional burden as respondents report on either the FR 2009a or FR 2009c.

In addition, the Federal Reserve proposes to reduce the authorized panel size. The Federal Reserve proposes a reduction to 160 from 183 utilities, and a reduction to 150 from 198 cogenerators. The proposed reduction in utilities mostly reflects industry consolidation. The proposed panel size of cogenerators would still allow for adequate coverage in the target population. As the industry evolves, the Federal Reserve will, as appropriate, solicit new respondents to bring the panels to full strength, or, if present coverage can be maintained with fewer respondents, consider reducing the panels further.

Frequency

The continuation of the electric power survey on a monthly basis is critical to maintaining the quality of the IP index. There have been a number of cases where physical-product data series obtained from government agencies or trade associations have been discontinued or changed from a monthly frequency to a quarterly frequency. Suitable monthly proxy data, such as the electric power series, provide a substitute or a means of interpolation and extrapolation of the quarterly physical-product data to derive monthly estimates of output. In times of tight budgets, the probability increases that certain physical-product data series may be discontinued, and electric power data will be needed as a substitute.

Utility Reporting Panel (FR 2009a and FR 2009c)

The primary criterion for inclusion in the panel is whether the utility provides electric power to industrial customers. In principle, relatively small utilities are included if they sell a significant amount of power to industrial customers. In practice, very few (in some districts none) of the small utilities are included. Conversely, a few large utilities are excluded because their industrial sales are negligible.

In 1991, there were 175 electric utilities participating in the survey. This represented about 6 percent of all utilities, but over 75 percent of total utility electric power generation. Currently 137 utilities are FR 2009a or c reporters, out of about 3,152 listed by the Department of Energy (DOE) in the 2000 Electric Power Annual. However, some of these utilities are undergoing reprogramming of their accounting systems at this time, so only 130 are actively reporting. This represents about 10 percent of kwh reported that will be estimated until normal reporting resumes. A comparison of Federal Reserve kilowatt-hour aggregates with 1996 Annual Survey of Manufactures (ASM) figures suggested coverage of about 75 percent of sales to manufacturing in that year. The reduced number of utilities reporting in 2002 represents a combination of consolidations and decreased sample coverage yielding about 50 percent coverage.

Under the proposal, the authorized panel size would drop to 160 from 183. The standard deviation of the growth rates for total electric power use is about 1.2 percent from 1973 to 1996, and is about 0.9 percent over that time if recessions are excluded. The measurement precision of the growth rates is largely determined by the utility sample, which represents about 95 percent of total combined sample coverage (utility plus cogenerator). Split sample analysis of the utility data suggests that the standard deviation of the measurement error of power use growth rates is 0.5 percent. In addressing the effect of possibly reducing the sample size for the electric power data, the Federal Reserve ran simulations to see how increasing the growth rate errors would affect data quality. A simulated reduction in the utility panel, such that coverage of electric power sales was reduced from around 80 percent to 60 percent, suggests an increase of 40 percent in the standard deviation of the measurement error of the growth rates, from 0.5 percent to 0.7 percent. Simulations further indicate that an increase of this size in the noise contained in the growth rates would add at least 0.06 to the noise-to-signal ratio (a rise to near 0.30) and cause the standard deviation of the power use growth rates to increase from 0.9 to 1.2 percent. Thus, any significant reduction in sample size does affect the quality of the electric power data. The proposed drop in authorized levels mostly reflects industry consolidation. The noise variance of the total IP index and major market group sub-indexes would rise somewhat less than one-quarter of this amount, corresponding to the contribution of electric power data to the IP index.

Cogenerator Reporting Panel (FR 2009b)

Under the proposal, the authorized panel size would drop to 150 from 198. The cogenerator panel is selected from firms in industries that use large amounts of electric power, such as producers of petroleum, chemicals, metals, and paper. The current panel consists of 124 cogenerators. Some cogenerators were added in 1992 to catch up with the substantial growth in new cogeneration facilities and to correct for inadequate coverage in some Federal Reserve districts. This panel expansion increased coverage from about 30 percent of cogenerated electric power to about 50 percent, judging from ASM data. The new data were incorporated into published series beginning in 1994. Using a split sample analysis of cogeneration data, the standard deviation of the errors in sample cogeneration growth rates is estimated to be 1.9

percent, down from 3.0 percent prior to the 1992 panel expansion. Many cogenerators have ceased operation in favor of purchased power since 1994. New installations are primarily independent power producers who market their power through utilities. The Federal Reserve believes that the total coverage from these sources is essentially unchanged since that time.

The Federal Reserve does not know the percentage of all cogenerators that the 124 respondents represents because a universe listing for cogenerators is not available from the government or other sources. The DOE discontinued their series on cogenerated electric power in 1980. A survey by DOE does not permit disclosure of individual respondent information. The Census Bureau data have similar disclosure restrictions. Aggregate data on annual industrial self use of cogenerator power cannot be broken out from the DOE nonutility survey. Their reporting panel consists of approximately 1,800 non-utility power producers (some of which are cogenerators) with a capacity of at least one megawatt. Many of these sell all their power to utilities or to non-manufacturing enterprises. The Federal Reserve feels that the reduction in the authorized panel size allows for adequate representation while permitting expansion of the respondent pool should the opportunity arise.

Time Schedule for Information Collection and Publication

Respondents submit their data monthly to the appropriate Federal Reserve Bank, between the twentieth and the twenty-fifth day of the month following the usage period. The data are transmitted to the Board by the third business day of the month following collection by the Reserve Banks and are incorporated into the IP indexes that are published in the G.17 statistical release on or around the fifteenth day of that month. Data are estimated for respondents that report late; the estimates are included in the indexes published in the G.17 release. The actual data are subsequently included in the revised IP series in the following month's G.17.

Legal Status

The Board's Legal Division has determined that this report is authorized by law (12 U.S.C. §225a, 263, 353 et seq, and 461) and is voluntary. Individual responses are exempt from disclosure pursuant to the Freedom of Information Act (5 U.S.C. §552 (b)(4)).

Consultation Outside the Agency

There has been no consultation outside the Federal Reserve System.

Sensitive Questions

This collection of information contains no questions of a sensitive nature, as defined by OMB guidelines.

Estimates of Respondent Burden

The annual burden for the FR 2009a,b,c is estimated to be 2,820 hours, as shown in the table below. The proposed reduction in authorized panel size would cause reporting burden to decrease by 564 hours. Total burden for this information collection represents a negligible portion of total Federal Reserve System reporting burden.

	<i>Number of respondents⁹</i>	<i>Annual frequency</i>	<i>Estimated average hours per response</i>	<i>Estimated annual burden hours</i>
Current				
FR 2009a/c	183	12	1.0	2,196
FR 2009b	198	12	0.5	<u>1,188</u>
<i>Total</i>				3,384
Proposed				
FR 2009a/c	160	12	1.0	1,920
FR 2009b	150	12	0.5	<u>900</u>
<i>total</i>				2,820
Change				-564

Based on a rate of \$20 per hour, the estimated cost to the public for this report is \$56,400.

Estimate of Cost to the Federal Reserve System

Estimates of the annual cost to the Federal Reserve System of collecting and processing the proposed revised report will be obtained.

9. The figures in the "number of respondents" column of the table represent the authorized panel size. Actual panel sizes are 137 utilities for the FR 2009a,c and 124 cogenerators for the FR 2009b.