

EIA's Frames: How Do We Know If They Are Sufficient?

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Introduction

The quality of EIA's data has been made a priority and has been made part of its Strategic Plan. Goal 1 of the EIA Strategic Plan states "...EIA's information products will retain or improve their high quality..." One of the performance measures and targets for this goal involves evaluating the EIA frames. The measure is the percent of EIA survey frames with sufficient industry coverage to produce reliable supply, demand and price statistics.

We began by preparing a list of EIA survey frames and update procedures. A table of EIA frames is enclosed (Attachment 1). The table also includes EIA's consumption surveys, which are very large samples. The table shows the survey's name, number of respondents, and frequency of frames updates activities.

We are now in the process of gathering existing information on the quality of our frames. This presentation will provide examples of activities to assess frame quality and ask for the Committee's guidance on other activities that could be used to assess our frames. We are also interested in the Committee's thoughts on how we can develop criteria to define sufficient coverage.

Activities to assess frame quality include:

1. Checking the frame against alternative lists at the respondent level (suggestion taken from the Statistical Policy Working Paper 15). There are some situations where we know we have good coverage. For example, all nuclear plants are known through the Nuclear Regulatory Commission. In addition, the natural gas marketer survey uses state-licensed marketers. In other situations a more detailed examination is necessary. Following are three examples of recent activities.
 - A. Renewable Electric Plant Information System (REPiS) database was developed and is maintained by National Renewable Energy Laboratory with funding from the Department of Energy's office of Energy Efficiency and Renewable Energy

(EE), whose data come from publicly available sources, such as federal and state government publications and reports; trade associations; trade press literature, such as weekly newsletters; and personal communications with industry and government officials. No surveys are conducted to collect data. The data represent "best efforts" at compiling and verifying an inventory of all known grid-connected renewable electric facilities in the United States. EIA utility and non-utility electric power plant data from survey Form EIA-860 were compared to data from REPiS. The eventual outcomes of the comparison were: 1) the data matched exactly across data sets; 2) a unit was in the EIA data but not in REPiS; 3) in REPiS but not in EIA; 4) information for one or more of the data elements of interest was inconsistent across databases. (All project worksheets are available.) If the data differed, staff familiar with the EIA-860 survey was contacted for more information, e.g., updated data, or any changes to the data that might explain the difference in the comparison. As a result of the comparisons 214 potential missing plants amounting to 2418 MW of nameplate capacity were identified. We are still in the process of reviewing these plants prior to updating the frame. Attachment 2 is the paper in its entirety.

- B. We have drafted a proposal for the Census Bureau (attachment 3) to compare several EIA surveys with either MECS or the Economic Census. The surveys that we are interested in obtaining an evaluation of coverage of their 2002 frames include EIA's "Annual Electric Generator Report" (Combined Heat and Power Plants, NAICS 31-33), "Quarterly Coal Consumption and Quality Report, Manufacturing Plants", "Annual Solar Thermal Collector Manufactures Survey", "Annual Photovoltaic Mod/Cell Manufacturers Survey", and "Quarterly Coal Consumption and Quality Report, Coke Plants."
 - C. EIA cross-referenced it's respondent i.d. lists between the Quarterly Coal Consumption and Quality Report, Manufacturing Plants," and the "Power Plant Report" In order to reduce duplication of respondents for both surveys. As a result we added 1 respondent to the frame for the Quarterly Coal Consumption and Quality Report.
2. Data Comparisons at an aggregate level (certain EIA data compared with similar data outside of EIA). The Petroleum Marketing Division compared data series with others that should match in volumes and price such as the Bureau of Labor Statistics (BLS) Office of Consumer Price Index (CPI) data for retail prices of motor gasoline, diesel fuel, and residential No. 2 fuel oil and Form EIA-878, "Motor Gasoline Price Survey," for retail prices of gasoline. Differences across data sources could indicate differences in survey methodology and conceptual differences, but can also identify coverage and reporting errors. There was a large difference in estimates of volumes of residual fuel oil prior to 1993. As a result improvements were made when exclusionary lists were added for the respondents' use. This change improved coverage and eliminated double

counting of volumes sold. A data correction was also made separating imports of residual fuel oil and unfinished oil. This reduced the gap between data series for residual fuel volumes. See attachment 4 for details.

3. Examining Supply/Disposition Balances (supply should equal disposition, but because the data that comprise the supply/disposition balances are from different surveys, a balancing item is needed. If the balancing item becomes large, it could be an indication of a frame or other data quality problem). The Natural Gas Annual Table 1 shows a narrowing of its balancing items. In 1998, there was a 634,809 million cubic feet (mcf) difference between supply and disposition. By 2002, the gap had narrowed to -39,942 mcf. Two exercises that the natural gas division engaged in may have been the factors for the improvement. 1) The source from where the data on deliveries to the electric power sector was obtained was changed. And 2) The frames for the form EIA-176, “Annual Report of Natural and Supplemental Gas Supply Disposition” was evaluated and the respondent list was adjusted to include or drop respondents as appropriate. See the attachment 5 for more details on the balancing item. Other balancing items have been examined in other parts of EIA. See the following URLs.
http://www.eia.doe.gov/emeu/aer/pdf/pages/sec7_5.pdf,
http://www.eia.doe.gov/emeu/aer/pdf/pages/sec8_5.pdf,
http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_monthly/current/pdf/stable2.pdf,
http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/natural_gas_annual/current/pdf/table_001.pdf
4. For price data, a comparison of volumes that the price data represent with total volumes. For example, natural gas commercial price data represent about 78 percent of total commercial volumes in 2002. This is because the price data have been collected from pipelines and local distribution companies which no longer know the price of all of the gas they deliver if it is sold by marketers. EIA introduced Form EIA-910, “Monthly Natural Gas Marketers Survey” to capture the price of natural gas sold by marketers to residential and commercial customers in five states with active customer choice programs. Attachment 6 is our evaluation of the survey at:
www.eia.doe.gov/smg/asa_meeting_2003/fall/files/natgaseval.doc

Next Steps and Question for the Committee

We will continue to gather information on frames assessments throughout EIA and to see where there are areas where no assessments have recently been done. We will also try to obtain information from other agencies on how they determine whether they have sufficient coverage and to begin discussions within EIA on criteria to define sufficient coverage.

Given that we will have information on coverage from different sources (checking alternative lists, comparisons at the aggregate level, examination of balancing items), what are the Committee’s thoughts on how to define sufficient coverage?

Attachment 1: Frame Matrix

Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
Petroleum Supply Programs						
EIA-810, Monthly Refinery Report And EIA-820, Annual Refinery Report	<p>The 810 must be submitted by the operators of all operating and idle petroleum refineries,—located in the 50 States, District of Columbia, Puerto Rico, the Virgin Islands, Guam and other U.S. possessions. Serves as frame for EIA-800.</p> <p>The EIA-820 goes to all 452 refineries, including all operating and idle petroleum refineries (including new refineries under construction) and refineries shutdown during the previous year, located in the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, Guam and other U.S. possessions.</p>	<p>151</p> <p>151</p> <p>10/21/2003</p>	<p>No new refineries built, but kept aware of mergers through trade press and respondents. For mogas blend terminals—check 811 stock info to see if Respondents are reporting mogas blending components as well as fuel ethanol in states where their co’s don’t report mogas blending components. Get RFG producers from EPA</p>	Monthly	<p>Nov. 2003 – 14 added ?????</p> <p>(Were these blenders?)</p>	<p>Varied: Refineries known, blenders may not be known. Do have some internal cross checking with other EIA surveys. Usual merger problems.</p>
EIA-811, Monthly Bulk Terminal Report	<p>Every bulk terminal operating company located in the 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands, and, every merchant oxygenate plant the produces oxygenates located in the 50 States, the District of Columbia, Puerto Rico, and the Virgin Islands. 811 is the frame for the EIA-801</p>	<p>248</p> <p>bulk plants?</p> <p>10/21/2003</p>	<p>Examine industry periodicals that report changes in status (births, deaths, sales, and acquisitions) of petroleum facilities producing, transporting, importing, and/or storing crude oil and petroleum products. These sources are augmented by articles in newspapers, letters from respondents indicating changes in status, and information received from survey systems operated by other offices. A sample control meeting focuses on changes in the current monthly data as it relates to the weekly surveys, that impact the monthly surveys, and changes in respondent reporting patterns.</p>	Monthly	Shifting blenders to 811 from 810	<p>Largely unknown. Have some internal cross checking.</p>

Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-812, Monthly Product Pipeline Report	Operators of all product pipeline companies that carry petroleum products (including interstate, intrastate, and intracompany pipelines) in the 50 States and the District of Columbia. Frame for the EIA-802.	83 10/21/2003	Examine industry periodicals that report changes in status (births, deaths, sales, and acquisitions) of petroleum facilities producing, transporting, importing, and/or storing crude oil and petroleum products. These sources are augmented by articles in newspapers, letters from respondents indicating changes in status, and information received from survey systems operated by other offices. A sample control meeting focuses on changes in the current monthly data as it relates to the weekly surveys, that impact the monthly surveys, and changes in respondent reporting patterns.	Monthly – mostly stable, few new pipelines		Guess OK – not many new.
EIA-813, Monthly Crude Oil Report	Companies which carry or store 1,000 barrels or more of crude oil. Included are: gathering and trunk pipeline companies (including interstate, intrastate, and intracompany pipelines), crude oil producers, terminal operators, storers of crude oil (except refineries), and companies transporting Alaskan crude oil by water in the 50 States and the District of Columbia. The 813 is the frame for the EIA-803	147 10/21/2003	Find out about mergers, sales and acquisitions by reading or from respondents.	Monthly	Nov. 03 – 2 had corp name and id change	Largely unknown. No cross checks.

Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-814, Monthly Imports Report	Each Importer of Record (or Ultimate Consignee in some situations regarding Canadian imports) who imports crude oil or petroleum products: into the 50 States and the District of Columbia, into Puerto Rico, the Virgin Islands and other U.S. possessions (Guam, Midway Islands, Wake Island, American Samoa, and Northern Mariana Islands, into Foreign Trade Zones located in the 50 States and the District of Columbia, and from Puerto Rico, the Virgin Islands and other U.S. possessions into the 50 States and the District of Columbia. Frame for the EIA-804.	175 10/21/2003	Industry articles, the internet, contacts that currently file the EIA-814, and information received about sales and mergers from contacts on other surveys. Don't we use the imports data from customs as processed by Census any more?	Monthly	11/26/03 – 1 id change	Unknown, but probably have external data for cross checking.
EIA-815, Monthly Terminal Blenders Report	All operators of motor gasoline blending terminals.	227	New this year			Unknown
EIA-816, Monthly Natural Gas Liquids Report	Operators of all facilities that extract liquid hydrocarbons from a natural gas stream (natural gas processing plant) and/or separate a liquid hydrocarbon stream into its component products (fractionator).	422 10/21/2003	Updates are usually provided by contacts with companies that are either selling a gas processing plant or are in the process of purchasing a plant from another company. Very rarely are new plants added to the frame as the universe of gas plants has been declining for years. Other sources include trade press articles and industry contacts.	monthly	No changes during Nov 03.	Probably OK since no/few new plants built. Is this tied to 64a?

Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-817, Monthly Tanker and Barge Movement Report	All companies that have custody of crude oil or petroleum products transported by tanker or barge between PAD Districts; and; All companies that have custody of crude oil or petroleum products originating from a PAD District and transported to the Panama Canal; and; All companies that have custody of domestically originating crude oil or petroleum products transported from the Panama Canal to a PAD District. Commodities transported on company-owned tankers and barges are to be reported on the EIA-817. In addition, the EIA-817 requires those parties that charter or lease the services of transportation companies, either on a contract or spot basis, to report to the EIA those shipments carried out by such firms..	42 10/21/2003	Examine industry periodicals that report changes in status (births, deaths, sales, and acquisitions) of petroleum facilities producing, transporting, importing, and/or storing crude oil and petroleum products. These sources are augmented by articles in newspapers, letters from respondents indicating changes in status, and information received from survey systems operated by other offices. A sample control meeting focuses on changes in the current monthly data as it relates to the weekly surveys, that impact the monthly surveys, and changes in respondent reporting patterns.	Monthly	No changes during Nov 03	Unknown. Anything from Coast Guard?
EIA-819, Monthly Oxygenate Telephone Report	the operators of all facilities that produce (manufacture or distill) oxygenates (including merchant and captive MTBE plants, petrochemical plants, and refineries that produce oxygenates as part of their operations); <i>stocks of merchant MTBE plants</i> , operators of petroleum refineries; and importers of oxygenates (importer of record) selected by the EIA located in or importing oxygenates into the 50 States and the District of Columbia.	138 10/21/2003	The 819 is in transition. The frame was for MTBE plants. Now the frame will be users of Fuel Ethanol for blending. How do they keep the list of ethanol producers up to date? Do they use the 810, 811, and 914?	Operators of captive mtbe do not have to include their stocks, but they still have to include their production.		Unknown, especially for ethanol.

PETROLEUM MARKETING PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-863, Petroleum Product Sales Identification Survey	<p>No. 2 distillate and residual fuel oil dealers, motor gasoline resellers, and propane resellers.</p> <p>The EIA-863 survey responses act as the attribute frame used for the EIA-782, EIA-821, EIA-877 and EIA-888 surveys.</p>	24,400 09/09/2003	<p>Every four years, a comprehensive list is constructed using over 100 sources, in addition to the previous period's EIA-863 and the Master Frame File (MFF) for all OOG. After the list is unduplicated and conflicts resolved, companies thought to potentially be in scope (sell #2 distillate, residual fuel oil, gasoline, and propane) are mailed the EIA-863 form. The MFF records the current status (along with other control information) of the companies participating in any/all OOG surveys. On an ongoing basis this status information is also communicated to the EIA-863 file and the status of companies is updated there also. On an ongoing basis we also review industry journals/newsletters that discuss sales, mergers, acquisitions etc and update the EIA-863 and MFF manually as these activities are implemented by the companies. Prior to the selection of a sample, the EIA-863, the MFF and the survey control and volume data from the various surveys are again compared. Conflicts in company sizes, or status are resolved and if necessary the EIA-863 is updated/corrected.</p> <p>In addition, we also constructed another frame of gasoline outlets for sampling for the EIA-878. This frame was constructed by purchasing a private list (from OPIS) and augmenting it with outlet information received directly from a few companies known as mass retailers/hypermarkets (new to the industry and not adequately represented in private lists). This frame is new and procedures are still being developed for how to update it.</p>	A comprehensive update is done every 4 years to the EIA-863 but also update it on an ongoing basis using information obtained from the various OOG surveys and industry journals/press releases/newsletters, etc.	Update done in 2003 for reference year 2002. Just completing work on frame.	<p>“as good as EIA gets”</p> <p>Is a systematic process, on a recurring schedule (4 years) where the listing is edited and unduplicated. Well documented.</p>

NATURAL GAS PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-176, Annual Report of Natural and Supplemental Gas Supply and Disposition	<p>Interstate natural gas pipeline companies, Intrastate natural gas pipeline companies, natural gas distribution companies, underground natural gas storage operators, synthetic natural gas plant operators,</p> <p>EIA-176 used to develop the EIA-857 frame. Provides frame for the survey of LNG storage operators. Provides frame for the monthly and weekly NG storage surveys – the EIA-191 and EIA-912.</p>	1,300 11/18 /2002	General frame updates are based on changes in ownership. Major exhaustive frame updates are done by searching State and Federal records via websites.	<p>EIA-176 frame updates are ongoing as we become aware of: Change in respondent name, address, company name and/or address. Change in ownership.</p> <p>Major frame updates are not routinely done, but are done every couple of years.</p>	<p>A major frames update was done in 2002 for our 2001 responses.</p> <p>52 companies added, 35 dropped, 6 changes in ownership</p>	Largely unknown. Would help to know what website/agencies were used, and if on a schedule.
EIA-910, Monthly Natural Gas Marketers Survey	Form EIA-910 must be completed by all natural gas marketers with residential and/or commercial customers in the States of Georgia, Maryland, New York, Ohio, and Pennsylvania. These States have been selected based on the percentage of natural gas sold by marketers in the residential and commercial end-use sectors.	154 11/18 /2002	Check with the State Public Utility Commission (State Web Sites) for approved marketers and compare with current frame.	Every two months	November—1 new respondent, 2 dropped.	100% coverage. Complete and well documented.
EIA-895, Monthly Quantity and Value of Natural Gas Report	State agencies that collect data on the volume of natural gas production in the State and the U.S. Minerals Management Service for the Outer continental Shelf.	32 11/18 /2002	The frame consists of 32 gas producing states. The States that produce gas have remained stable over time.			2 nd -party data. Can debate if this is a frame problem or a processing problem, but it is a problem, and is one reason for the new natural gas production survey .

RESERVES PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-23, Annual Survey of Domestic Oil and Gas Reserves	Each operator of domestic oil and/or gas well as of December 31. Operator is the person responsible for the management and day-to-day operation of one or more crude oil and/or natural gas well Formerly the EIA-23P used to update frame. Is this still true? Describe procedure used to augment the frame during 2003.	22,000 for the 2002 survey 30,000 for the 2003 survey 12/10/2003	Name and address list for EIA-23 (large and small operators) are updated based on annual survey responses, state agencies, publications and commercial source such as IHS Energy Group. Internet is a great asset for locating oil and gas field operators updating addresses, telephone numbers, etc.	Annually	2003 – but we need a description of what was done.	Unknown since it is not clear what was done. Should have some external comparisons, and new natural gas survey should help.
EIA-64A, Annual Report of the Origin of Natural Gas Liquids Production	Each operator of one or more domestic natural gas processing plant as of December 31, even if the plant was operating only part of the year.	527 12/10/2003	Updated based on survey responses, state agencies, publications and commercial sources such as HIS IHS Energy Group. Do you use information from the EIA-816 frame?			Tied to 816, but why does this have 100 more respondents?

ALTERNATIVE FUELS PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-886, Annual Survey of Alternative Fueled Vehicle Suppliers and Users	All organizations supplying or using any quantity of AFVs are requested to complete this form. Regarding AFVs in use, as of the previous report year, EIA is surveying the following fleets: federal government, state government, electric utilities, natural gas fuel providers, propane fuel providers, and transit agencies.	2,491 05/17 /2001	<p>Frame maintenance occurs in two ways: (1) cycle-to-cycle maintenance based on current data call and (2) comprehensive outside-source updates to identify new additions to the frame. During 2002 and 2003, a major frame update was done.</p> <p>Cycle-to-cycle: 1. Purge companies who have reported one of three categories: 1. No longer functioning 2. Sold and/or merged with another company 3. Does not meet the reporting criteria</p> <p>If sale or merger, make sure appropriate units are included or dropped. Outside frame maintenance occurs at the individual frame level (federal, state, fuel provider, transit agency, OEM, and converter) and was performed as follows: <u>Federal</u>: covered completely by FAST, no need to investigate. <u>State</u>: Westat delivered a fully re-vamped state frame for use in the 2004 data call. <u>Transit</u>: the FTA (Federal Transit Authority) and APTA (American Public Transit Assoc.) publications that identify new transit agencies using AFVs were reviewed and new units added <u>OEM</u>: heavy duty manufacturing industry examined to ensure that our OEM frame was complete. <u>Converter</u>: current frame reviewed and extensive internet and industry resources reviewed to identify active converters. <u>Propane</u>: used the EIA-863 and developed a sample from its frame. The Form EIA-863 contains a question on the form regarding using propane as vehicle fuel. <u>Natural Gas</u>: Review the EIA-176 frame. <u>Electric</u>: review the EIA-861 frame for info in response to a question on AFV usage but it is not edited and therefore not credible.</p>	<p>2003 Births Natural Gas 56 Electric 91 Propane 375 (weighted sample, newly drawn) OEMs 8</p> <p><u>Deaths</u>: 319; this number can be broken down by frame if needed.</p> <p><u>Mergers</u>: 6</p>		<p>Varied. Have good coverage for some areas, such as municipal transit agencies, but probably poor for conversions. Someone needs to research whether we are still snowballing this.</p>

Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-63A, Annual Solar Thermal Collector Manufacturers Survey	Companies that manufactured and shipped (including exporting) solar thermal collectors and/or that imported solar thermal collectors during the *previous survey year.	57 09/26 /2001	Industry sources and periodicals. Newly identified companies report previous year's data.	Annually	2003	Guess OK, since we should be able to find companies that are actively marketing their products, but we might miss some imports and small operations.
EIA-63B, Annual Photovoltaic Module/Cell Manufacturers Survey	Companies that manufactured and shipped (including exporting) photovoltaic cells and modules and/or that imported photovoltaic cells and modules during the previous survey year.	43 09/26 /2001	Industry sources and periodicals. Newly identified companies report previous year's data.	Annually	2003	Should be OK, with possible exception of imports. Census may evaluate this one.
EIA-902, Annual Geothermal Heat Pump Manufacturers Survey	All companies within the 50 States, District of Columbia, Puerto Rico, the Virgin Islands, Guam, and the other U.S. territories and possessions which manufactured and shipped any geothermal heat pumps during <i>the previous year</i> .	40 07/08 /2003	Industry sources and periodicals	Annually	2003	Should be OK with possible exception of imports.

ELECTRICITY PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-860, Annual Electric Generator Report	All electric generating plants, which have or will have a nameplate rating of 1 megawatt (1000 kW) or more, and are operating or plan to be operating within 5 years of the year of this form. The operator (or planned operator) of jointly-owned plants should be the only respondents for those plants. The respondents report at the equipment level. Survey serves as frame for most electric surveys.	2,450 09/10/2001	Fossil- fired plants are required to get a plant code from us before they can get air and other permits to start construction. {why – we do not have regulatory authority, and do not give permits} We add them to the frame at that point. Other plants like renewable fueled facilities are more difficult to find out about. We review industry newsletters, web sites. Some automatically report to us as the plant enters the planning and/or construction phase as they are required too.	Constantly. as we find out about a new plant or a change in status of an existing one.	12/5/03 – 4 plants added	Some are known to be good, such as utilities and former utilities. DOE’s FE did a comparison on some, and Census may evaluate some.
EIA-861, Annual Electric Power Industry Report	Electric industry participants including: electric utilities, wholesale power marketers (registered with the Federal Energy Regulatory Commission), energy service providers (registered with the States), and electric power producers. Serves as frame for the EIA-826	4,800 09/10/2001	The frame for the non-utility sector is derived from the EIA-860 survey, which maintains the frame for non-utility power producers. The utility frame is updated usually in November and December, just prior to forms mailout in January for reporting data covering the preceding year. Sources of information on industry participants (i.e., trade organization membership lists, filings with the Federal Energy Regulatory Commission, State-level Public Utility Commission listings) are canvassed and phone calls are made to verify potential respondents’ requirement to complete the survey. Frame research during the remainder of the year responds more to specific information, which has come to our attention concerning new participants, mergers, etc.	Throughout the processing cycle with most updating taking place in November and December.	December, 2003. 20 utility sector respondents dropped. The non-utility sector increased by several hundred facilities.	(same as 860)

FRS PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-28, Financial Reporting System	The Administrator of EIA has designated the 29 major energy producing companies required to report. Respondents have been notified of their reporting requirements.	27 09/16 /2003	<p>The frame is the entire set of publicly traded, U.S.-based energy companies, including publicly-traded U.S. subsidiaries (such as Shell Oil and BP America) of foreign energy companies (i.e., Royal Dutch Shell owns Shell Oil and BP plc owns BP America).</p> <p>The most important frames update issue for the FRS is that electricity (utility companies) is included in the FRS law as being a required component of the FRS (and its now in the form, as you know), but - due to budget problems - EIA has decided (for now at least) not to change the selection criteria to include major utility companies as FRS major energy companies. So, the FRS will deteriorate over time, due to this budget-driven frames problem.</p>	Annually	2003	Frame is limited but complete. Is self-defined and well documented.

COAL PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-3, Quarterly Coal Consumption and Quality Report, Manufacturing Plants	All manufacturing facilities that consume in excess of 1000 short tons of anthracite, bituminous coal, sub-bituminous coal, or lignite for uses other than coke production during a one-year period. This definition includes facilities such as synfuel plants, which use coal as feedstock. This requirement includes all facilities using coal for gasification/liquefaction and coal used for feedstock.	562 01/15 /2002	Changes in ownership are tracked on an ongoing basis. How are new facilities identified that meet the reporting requirement?	Quarterly	Dec 2003, 3 units added.	Varied. Compared a subset to electric surveys in past, and Census may evaluate some.
EIA-5, Quarterly Coal Consumption and Quality Report, Coke Plants	All companies operating coke plants within the United States.	24 01/15 /2002	Changes in ownership are tracked on an ongoing basis. How are new facilities identified that meet the reporting requirement?	Quarterly	Last quarter	Probably OK – not growing and Census may evaluate.
EIA-6A, Coal Distribution Report – Annual	All companies in the 50 United States and the District of Columbia that owned or purchased and distributed 50,000 or more tons of coal during the reporting year. All companies in the states of Arkansas, Maryland, Oklahoma, and anthracite operations in Pennsylvania that owned or purchased and distributed 10,000 or more short tons during the year shall submit the Form EIA-6A. These companies include coal mining companies, wholesale coal dealers (including brokers), and retail coal dealers. Companies that take custody (physical possession) of the coal and transport but never own the coal need not report.	1,000 01/15 /2002	The 6A survey asks respondents to identify those from whom they purchase and to whom they sell coal Accordingly, the survey is, in a sense, self-maintaining because firms buying or selling more than 50,000 short tons of coal in a year are presumed to be included in the frame unless they can establish otherwise (i.e. firms that broker sales but don't take title are not included.)	Annually	2003 13 added, 44 moved to inactive	Unknown. Sounds like a challenging universe, especially with such a small threshold.
EIA-7A, Coal Production Report	All coal mining operations that produced and/or processed 10,000 or more short tons of coal and/or worked 5,000 hours or more during the reporting year. A separate Form EIA-7A must be submitted for each Mine Safety and Health Administration (MSHA) ID.	1,850 01/15 /2002	The EIA-7A frame is updated based on the EIA-7A data submission. For the EIA-7A New Mines and Non-respondents: The EIA-7A frame is updated based on the MSHA Form 7000-2 data submission.	Annually	December 2003 – 250 added, 300 dropped	OK Have MSHA ID and some data from states.

URANIUM PROGRAM						
Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-851, Domestic Uranium Prod. Report	Firms and individuals that were involved in the (domestic) U.S. uranium industry	28 09/10 /2003	Information from previous EIA-851 surveys, Electric Power Monthly, NRC, nuclear companies, uranium trade press, and internet research.	Annually	2003 3 added, 5 dropped, 4 mergers	Probably OK This is a small and visible group.
EIA-858, Uranium Industry Annual Survey	Firms and individuals that were involved in the (domestic) U.S. uranium industry	70 09/10 /2003	Information from previous EIA-858 surveys, Electric Power Monthly, NRC, nuclear companies, uranium trade press, and internet research.	Annually	2003 3 added, 5 dropped, 4 mergers	Probably OK This is a small and visible group.
EIA-871A/I, Commercial Buildings Energy Consumption Survey	The physical characteristics information for commercial buildings is collected using Form EIA-871A in interviews with owners, managers, or tenants of buildings. Respondents at hospitals and university/college complexes also complete Form EIA-871I to summarize their operations. In cases where the building respondent is unable to provide energy consumption and expenditure data, the information is collected by mail from individual energy suppliers by using Forms EIA-871C through F (depending upon the energy source).	4.7 mil.	Someone needs to double check, but I think they did a completely new area frame based on the 2000 Census for last CBECS.			“as good as EIA gets” No comparions, and multi-frame, but complete and well documented
EIA-457A/G, Residential Energy Consumption Survey (RECS)	Housing, appliance, and demographic characteristics data are collected via personal interviews with households, and consumption and expenditure billing data are collected from the energy suppliers. Rental agents are contacted by telephone to check on fuels used in rented units.	107 mil.	The city planning department zoning offices of large cities. County offices of towns. Rural areas: county, town or village offices The 2001 RECS still used an area frame derived from the 1980 Census.	We used to update every new years based on the new census. I am told that the update we are about to begin will be used for 20 years.	1993--based on the 1990 census updated for new construction We do not have a longitudinal component to the RECS— Of the 1,460 SSU's, 1,368 received listing updates while the remaining 92 received new listings.	“as good as EIA gets” Approximte Comparisons with Census. Complete and well documented.

Survey Form	Description of Respondents	No. Of Units	How updated	How often Updated	Last time Updated	Initial Guess
EIA-846(A,B,C), Manufacturing Energy Consumption Survey (MECS)	Since 1991, the survey has also collected information on end users of energy, participation in energy management programs, and penetration of new technologies. Respondents are a sample of manufacturing establishments.	237,000	The frame is the mail portion of the Census of Manufactures (CM). A new CM is conducted every 5 years on years ending in 2 or 7. The MECS is a quadrennial survey and thus will fall at different intervals within the 5 year period from CM to CM. The Census Bureau does regular annual updates to the survey by using IRS records and it's Company Organization Survey to get at mergers and acquisitions.	See previous column. Also important is the determination of the establishment's measure of size (MOS), which is the most recent measure of cost of fuels and electricity. When not available from the frame, the most recent data available from the Annual Survey of Manufactures (ASM), an imputation from payroll data from IRS records, or an imputation based on industry averages is used.	The 2002 CM is still in the field so the number of units has not yet been determined since reclassifications, new deaths, etc. will be identified. The last complete Census was done for the year 1997. The "total" number of establishments, both mail and nonmail, for 1997 was 377,776 and for 1992 that total was 370,912. About 240,000 establishments in both years made up the mail file in the CM, which is the basis for the MECS frame. The mail file in the CM makes up 97 to 98 percent of the total manufacturing payroll for any industry selected.	Good coverage. Conducted by Census.

What about the 1605? Need to say that it has lousy coverage since self-selected corporations report self-selected portions of their operations. Also, where is the natural gas 191 storage survey? I think that has good coverage since large fields are known.

Attachment 2: EIA-REPiS Data Reconciliation Project Draft Report

I. Introduction

Renewable energy is an increasingly important part of the total energy supply in the United States.¹ Current and planned state and federal energy legislation rely on the knowledge of knowing where and how much renewable energy is in use and available. It also is the most dispersed of energy sources and is often deployed on a relatively small scale. Finally, most non-hydroelectric renewable facilities, or, plants, are owned by nonutilities, making them more difficult to locate. (In 2002, 95 percent of total non-hydroelectric renewable capacity was nonutility.) For these reasons, it is important to establish a quantitative benchmark of renewable energy. Such an effort was begun in 2001 by the Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EE), National Renewable Energy Laboratory (NREL) and the Energy Information Administration (EIA).²

II. Purpose of the Project

The purpose of this project was to pool the data from two Departmental sources in order to create a comprehensive database and one that would be agreed to by EE and EIA. Also, given the dispersed nature of renewable generating plants, as well as their relatively small size, it is important to identify and total the plants that were operational as of a particular time. The EIA-REPiS data reconciliation project, therefore, serves as a benchmark for energy data management and comprehension. That is, it will establish a baseline of all electric renewable energy plants as of the year 2000. Once such a baseline is established, future work will consist of updates.

¹ The energy industry in the United States is comprised of a spectrum of energy resources, technologies, manufacturers, utilities, and stakeholders. Therefore, data relating to this industry are substantial. The data are collected and organized by various institutions by different means. However, there is no one standard data collection or management method. This, combined with the extent of the data, can make research and policy-making a challenging task.

² The Department of Energy is the lead agency of the United States Government for energy issues (<http://www.doe.gov>). Within DOE, the Office of Energy Efficiency and Renewable Energy (<http://www.eere.energy.gov>) plays a key role in sustaining energy security, environmental quality, and economic vitality for the nation by enhancing energy efficiency and developing clean, reliable and affordable energy technologies.

The National Renewable Energy Laboratory (<http://www.nrel.gov>) is DOE's premier laboratory for renewable energy research and development and a lead laboratory for energy efficiency R&D. Research and development at NREL encompasses 50 areas of scientific investigation, including basic energy research, photovoltaics, wind energy, building technologies, advanced vehicle technologies, solar thermal electric, hydrogen, superconductivity, geothermal power and distributed energy resources.

The Energy Information Administration (<http://www.eia.doe.gov>) is the statistical agency of the DOE. It is the key agency involved in policy-independent data collection, analyses and forecasts of the entire spectrum of energy resources, methods and technologies and their interaction with the environment and economy. These efforts provide a basis for informed policy-making, aid in research and educate the public.

The data comparison also uncovered renewable generating plants that are potential candidates for inclusion in the EIA-860 (Annual Electric Generator Report), thereby improving the frame. A list of proposed additions is included as Attachment A.

The end product of the reconciliation project provides benefits not only to the two organizations involved, but also to a greater population. A population ranging from energy planners, industry, government, researchers, policy-makers to an individual interested in renewable energy can take advantage of, and extract needed information from, such an effort.

III. Databases

The Energy Information Administration is the government agency responsible for collection of official government data. It, therefore, follows a formal collection procedure. Form EIA-860 is sent to all types of electric generating plants (owned by utilities and non-utilities) in the United States. Electric generating facilities that have (or will have within 5 years of completion of the form) at least 1 megawatt (MW) of nameplate capacity are required, under Section 13(b) of the Federal Energy Administration Act of 1974 (FEAA) (Public Law 93-275) to complete this form and submit it to EIA annually. The information received back from generators via this form is entered into a database. This database is made available publicly on the web (<http://www.eia.doe.gov/cneaf/electricity/page/data.html>). Since the EIA-860 form is sent to all electric generating facilities, the database covers all energy sources, including grid-connected renewable energy sources. Therefore, for comparison purposes, it covers all the energy sources in REPiS. However, the data range is more limited since data are collected only on units that have a nameplate capacity of at least 1 MW.

The Renewable Electric Plant Information System (REPiS) database was developed and is maintained by NREL with funding from EE. It is the only database in the US that brings together the entire array of data on grid-connected renewable electric generators in the nation. Originally created in 1984 and now updated through 2002, REPiS contains information on operating as well as planned renewable energy units. It covers the following types of renewable energy technologies: biomass, geothermal, hydroelectric, photovoltaics (PV), solar thermal, and wind. The database is publicly available on the web (<http://www.eere.energy.gov/repis/>).

The data in REPiS come from publicly available sources, such as federal and state government publications and reports; trade associations; trade press literature, such as weekly newsletters; and personal communications with industry and government officials. No surveys are conducted to collect data. The data represent "best efforts" at compiling and verifying an inventory of all known grid-connected renewable electric facilities in the United States. The range of data is only limited by grid-connection, meaning that as long as a renewable electricity unit is connected to the electric grid, it is qualified to be in the database. There are no other limitations, such that, for example, the nameplate capacity can be a couple of kilowatts or thousands of megawatts; or, the unit can be retired, operating, or planned.

IV. Methodology:

EIA utility and non-utility electric power plant data were compared to data from REPiS. Actual comparisons were made at the generating unit level. These databases are differently constructed. Two differences are:

1. the size threshold for EIA is equal to or greater than one megawatt, while there is no size limitation in REPiS, and
2. for plants that have multiple owners, EIA reports one entry for the plant, while REPiS reports as many entries as there are owners.

A. Procedure:

A standard spreadsheet format (Appendix A in Attachment A) was adopted for comparing the data, which were organized by fuel type and identified as being from EIA or REPiS. The data elements compared were:

- \$ plant name
- \$ fuel type
- \$ number of units per plant
- \$ unit and plant codes
- \$ utility and owner names
- \$ year plant originally in service
- \$ unit and plant nameplate capacity
- \$ unit/plant status
- \$ location.

The eventual outcomes of the comparison were: 1) the data matched exactly across data sets; 2) a unit was in the EIA data but not in REPiS; 3) in REPiS but not in EIA; 4) information for one or more of the data elements of interest was inconsistent across databases. (All project worksheets are available.) If the data differed, staff familiar with the EIA-860 (Kysha Harvey, Jacqueline Campbell, Mam-Marie Binta Sallah, Tonya Dantzler, Betty Williams) was contacted for more information, e.g., updated data, or any changes to the data that might explain the difference in the comparison.

It is important to note that both the EIA-860 and REPiS databases that were provided to the Renewables Information Team for use in this comparison were hard-copy, plant-level listings. If REPiS had the same plant listed twice under different names – a frequent occurrence – renewables staff had no way of knowing about the duplicates, unless they happened to remember a name. Because of this, in several cases the Renewables Team matched one REPiS record with an EIA-860 record for a plant, but recorded a “non-match” for the same plant when REPiS listed it under a different name.

B. Data Reconciliation:

The criteria used for making determinations about the data were as follows:

All inconsistent plant name and address data were resolved by using EIA data, since EIA data derive from official mandated surveys.

All capacity differences were resolved as per Howard Bradsher-Frederick's recommendations. Howard verified capacities by inspecting original survey submissions to EIA, including updates, comparing these to the REPiS data, and looking for corroborative evidence where data did not match. (See ADraft Final ReportBErrors in Renewable Nameplate Capacity Data (including Hydroelectric): EIA and the Renewable Energy Plant Information System (REPIS) Data, August 23, 2002; Howard Bradsher-Fredrick. Included as Attachment B.)

C. Plant Contacts:

Names of operating company contacts were obtained in a variety of ways: company representatives, state energy offices, public utility commissions, trade associations, industry contacts. Also, since EIA conducts surveys, respondents were used to obtain plant contacts. Otherwise, phone numbers were obtained from directory assistance, the company was called and a contact person was identified.

The Environmental Protection Agency's (EPA) Operational, Electricity – Generating Projects database was used extensively for information on biogas, landfill gas, agricultural residue and timber residue plant locations and ownership, as well as plant contacts. These contacts were used to obtain and verify data, especially where plant size (equal to or greater than one MW) indicated inclusion in the EIA survey frame.

When renewables personnel contacted plants, the operating status and capacity of the plant were verified. In addition, a contact name and phone number were obtained for the plant. In many cases, the Electric Power Division will need to determine the final survey contact since the plant owner might be the reporting entity.

V. Renewable Plant Summaries

A. Solar PV:

Solar photovoltaic refers to electronic device consisting of layers of semiconducting materials fabricated to form a junction and electrical contacts such that it converts sunlight directly into electricity.

The comparison shows that the data are in agreement. (January 21, 2003, e-mail from Elvin Yuzugullu to Mark Gielecki, "EIA/REPiS data matching – PV"; Attachment C.)

B. Solar Thermal:

A solar parabolic trough is a high-temperature (above 180 degrees Fahrenheit) solar thermal concentrator (curved mirror) that focuses sunlight onto an absorber tube filled with oil or other

fluid. The hot oil boils water to produce steam, which is used to generate electricity. The Solar Electric Generating Systems (SEGS) referred to below use trough technology.

The data comparison agreed on the number of units. However, the capacities for two of the units differed by 56.4 MW (28.2 MW each). REPiS has revised its capacity for SEGS VIII and IX from 80 MW to 108.2 MW.

C. Hydroelectric:

Hydroelectric power plants use flowing water to produce electricity.

The comparison of hydroelectric power plant data identified 14 plants, totaling 41 megawatts MW, that were in the EIA database, but, not in REPiS.

D. Geothermal:

A geothermal plant is one in which a turbine is driven either by hot water or by natural steam that derives its energy from heat found in rocks or fluids at various depths beneath the surface of the earth. The fluids are extracted by drilling or pumping.

Nine plants, totaling 308 MW were identified as potential additions to the EIA frame.

E. Wind:

A wind power plant is a group of wind turbines interconnected to a common utility system through a system of transformers, distribution lines, and (usually) one substation. Operation, control, and maintenance functions are often centralized through a network of computerized monitoring systems, supplemented by visual inspection.

Results of a match of the EIA and REPiS wind project lists for the year 2000 were inconclusive. Too many projects were identified as falsely missing from the lists on both sides. This was due to the fact that a project could be in both lists, but the match would not be identified, because the plants changed owners/names, smaller wind farms were consolidated into larger ones, and information on location was ambiguous. A review of EIA and California Energy Commission data supported this conclusion.

For this reason and because the EIA survey system is not fully tracking all the wind capacity additions identified by industry sources for 2001 and 2002, the Electric Power Division is conducting a major review of the wind survey frames. After the review is completed, the new EIA wind projects list will be compared to an updated list from REPiS. Any differences will be resolved.

Based on comparisons with the American Wind Energy Association (AWEA) database, it is expected that the EIA frames may be 700 MW – 800 MW short of wind capacity at the end of 2002.

F. Biomass

The biomass resources used for electricity generation are categorized differently in the EIA and REPiS databases.

The EIA database separates biomass resources into nine main categories. These are: wood/wood waste, wood/wood waste liquids, wood/wood waste solids, municipal solid waste/landfill gas, other waste, agricultural byproducts/crops, other biomass gas, other biomass liquids, and other biomass solids. These categories are then broken down into more detailed elements, as seen in Appendix B, Table 1.

REPiS has six major biomass categories: agricultural residues; energy crops; municipal solid waste (MSW); biogas; landfill gas (LFG); and timber residues. These categories are described in more detail, as seen in Appendix B, Table 2. However, these detailed descriptions only serve the purpose of guiding the data manager as to which one of the main six categories to place the plant under. When one views a record in the REPiS database, the biomass resource that is displayed is only one of the six main categories – the details are not displayed.

When comparing records between the two databases, reasoning was used to relate the categories in an optimum way. For example, EIA categories such as wood waste solids, wood waste liquids, and etc. would relate to the timber residues category in REPiS. The MSW (of the MSW/landfill gas category) and other medical waste (of the biomass solids category) resources in EIA, even though they are different categories, would both relate to the MSW category in REPiS. Therefore, the reconciliation process of biomass resources was more detailed and complex. One needed to use logical reasoning, check more than one category, and also examine other variables such as plant name, location and capacity to make sure that the records were matching or that no match was found.

1. Municipal Solid Waste (MSW):

Municipal solid waste is composed of residential solid waste and some non-hazardous commercial, institutional, and industrial wastes. Generating plants (usually referred to as waste-to-energy, or, municipal waste combustion plants) that combust this fuel are included in this category.

Twelve plants, totaling 284 MW, have been identified as potential candidates for inclusion to the EIA survey frame.

2. Agricultural Residues:

Eight plants, totaling 112 MW, have been identified as potential candidates for inclusion in the EIA survey frame. Fourteen plants, totaling 307 MW have been identified for inclusion in REPiS.

3. Timber Residues:

One hundred and forty plants, totaling 1,517 MW, have been identified as potential candidates for inclusion in the EIA survey frame.

4. Biogas and Landfill Gas:

Biogas plants are fueled by a medium Btu gas containing methane and carbon dioxide, resulting from the action of microorganisms on organic materials. Landfill gas is generated by

decomposition of organic material at landfill disposal sites. Landfill gas is approximately 50 percent methane.

In REPiS, LFG is included in the biogas category; it is not shown separately. Therefore, for biogas and LFG combined, 45 plants, totaling 197 MW have been identified for potential inclusion in the EIA survey frame.

VI. Summary

The results of the comparisons are shown in the table below.

Grand Totals Across All Renewable Technologies				
	Missing from REPiS		Missing from EIA-860	
	Plants	MW	Plants	MW
Solar PV	0	0	0	0
Solar Thermal	0	56.4	0	0
Hydroelectric	14	41		
Geothermal			9	308
Wind³				
MSW			12	284
Ag Residues	14	307	8	112
Timber Residues			140	1517
Biogas and LFG			45	197
Grand Total⁴	28	404.4	214	2418

See Attachment D for the current status of the verification of these potential plant additions to the EIA-860 by the Electric Power Division. The geothermal data have been reviewed by Stan Kaplan (Attachment E). Based on that review, it was determined (and agreed to by the Renewable Information Team) that EPD would add seven geothermal units in four plants, totaling 92.3 MW, to the EIA-860 frame.

B. Significance:

The year 2000 REPiS database represents the universe of all grid-connected renewable electric generating plants. The EIA data are composed of all grid-connected renewable electric generating plants equal to or greater than 1 MW capacity. Both databases have been strengthened through this exercise.

³ EIA frame may be 700 MW to 800 MW short at end of 2002.

⁴ Not including wind.

The Electric Power Division is verifying the identified candidates for inclusion in the EIA survey frame. Those that are verified, will be included in the next EIA-860 survey cycle. Similarly, the plants identified for inclusion to the REPiS database have been added to REPiS.

The plant contacts that have been identified will be an asset in tracking plant ownership changes and new nonutility plants.

A database will be created with unique identifiers that provide a crosswalk between EIA and REPiS data for each plant. It will include a flag for plants equal to or greater than 1 MW, thereby identifying them as plants included in the EIA survey frame. In this way, plant additions and subtractions (retirements) will be tracked and the data will be consistent with the frame.

C. Currency of the Data:

These data are current as of the year 2000. Periodic updates will be required.

VII. Contributors and Acknowledgments

Individuals from EIA, EE, NREL and industry have contributed significantly to this project. Listed below are the names, organizations, and roles of the individuals involved.

EIA Office of Coal, Nuclear, Electric and Alternate Fuels:

Peter Holihan: Project coordinator. Data matching: solar photovoltaic (PV) units.

John Carlin: Data matching: agricultural residues and municipal solid waste (MSW) units.

Shirley Fleming: Data matching: biogas, landfill gas (LFG), and timber residues units. Located contacts for these units.

Mark Gielecki: Data matching: geothermal, solar thermal and timber residues units. Located contacts for geothermal units.

Louise Guy-Lee: Data matching: wind and solar thermal units.

(Fred Mayes provided general management and oversight of the project.)

NREL Energy Analysis Office:

Selya Price: Data matching: solar-photovoltaic (PV) units. Prepared and organized spreadsheets (consisting of data from both databases) to be utilized in data matching.

Elvin Yuzugullu: Prepared and organized spreadsheets (consisting of data from both databases) to be utilized in data matching. Provided support to EIA throughout the project, and edited the REPiS database in accordance with the findings of the project.

Christy Herig: Helped establish initial PV baseline.

(NREL project management provided by Douglas Norland and Eldon Boes.)

EE:

Lynne Gillette, formerly of the **Office of Solar Energy Technology**, was an initial sponsor of the project.

Raymond Fortuna, EE Office of the Geothermal Technology Program, provided and reviewed information.

Industry:

E.C. (Liz) Battocletti of Bob Lawrence & Associates helped coordinate support for the geothermal part of the work by contacting and soliciting the help of the Geothermal Energy Association (Julia Watkins) and various GEA members, including: Susan Petty, Caithness Energy; Richard Price, TMS, Inc.; Jim Horne, Calpine Corp. Robert Manicke, PhD., and Michael Blaha, PhD., of Calpine Corp. also provided useful information.

This support consisted primarily of identifying operational plants, their owners and plant contacts. This was especially helpful since many plants have recently changed ownership, going from utility owned to non-utility owned.

Appendix A: Please see Attachment A

Appendix B

Table 1

EIA

Biomass Energy	Code (1999)	Code (2000)
Wood/Wood Waste		
Black Liquor	BL	BL
Wood/Wood Waste Liquids		WDL
Red Liquor	RL	
Sludge Wood	SW	
Spent Sulfite Liquor	SS	
Wood/Wood Waste Solids		WDS
Peat	PT	
Paper Pellets	PP	
Railroad Ties	RT	
Utility Poles	UP	
Wood/Wood Waste	WW	
MSW/Landfill Gas		
MSW	MW	MSW
Landfill Gas	LF	LFG
Other Waste		
Agricultural Byproducts/Crops		AB
Agricultural Byproducts	AB	
Straw	ST	
Other Biomass Gas		OBG
Digester Gas	DG	
Methane	ME	
Other Biomass Liquids		OBL
Fish Oil	FO	
Liquid Acetonitrite Waste	LA	
Tall Oil	TO	
Waste Alcohol	WA	
Other Biomass Solids		OBS
Medical Waste	MD	
Solid Byproducts	SB	
Sludge Waste	SM	SLW
Tires	TI	TDF

Table 2

REPiS

Name	Fuel ID
Agricultural Residues (Waste)	Agricultural Residues
Cannery Wastes	Agricultural Residues
Nut Hulls	Agricultural Residues
Fruit Pits	Agricultural Residues
Nut Shells	Agricultural Residues
BioGas	BioGas
Alcohol (Term Includes Butanol, Ethanol, and Methanol)	BioGas
Bagasse	BioGas
Hydrogen	BioGas
Landfill Gas (Refuse Gas) see also METHANE	Landfill Gas
Livestock Manure	BioGas
Methane (LGAS or Sewage Gas) Includes Digester Gas	BioGas
Refuse Gas	BioGas
Municipal Sewage	BioGas
Wood Gas (from Wood Gasifier)	BioGas
Energy Crops	Energy Crops
Grains (Corn, Rice, Wheat)	Energy Crops
Municipal Solid Waste (Including Industrial and Medical)	Municipal Solid Waste
Hazardous Waste	Municipal Solid Waste
Refuse-Derived Fuel (Combustible Portion of Refuse)	Municipal Solid Waste
Refuse (Garbage, Trash)	Municipal Solid Waste
Scrap Tires (Could be Shredded)	Municipal Solid Waste
Wastewater Sludge	Municipal Solid Waste
Timber Residues (Milling Residues and Logging Residues)	Timber Residues
Tree Bark	Timber Residues
Wood Chips (from Milling/Logging)	Timber Residues
Hog (Hogged) Fuel	Timber Residues
Pulping Liquor	Timber Residues
Paper Mill Sludge	Timber Residues
Peat	Timber Residues
Tree Pitch	Timber Residues
Sander Dust (from Milling)	Timber Residues
Sawdust (from Milling)	Timber Residues
Shavings (from Milling)	Timber Residues
Tree Trim (from Milling)	Timber Residues
Wood or Wood Waste	Timber Residues

Attachment 3: Proposed Frame Analysis

A. Purpose of Analysis

1. Evaluate coverage of 2002 frames for EIA-860 (CHP), EIA-3, EIA-5, EIA-63a, and EIA-63b.
 - [EIA-860](#), “Annual Electric Generator Report” (Combined Heat and Power Plants, NAICS 31-33)
 - [EIA-3](#), “Quarterly Coal Consumption and Quality Report, Manufacturing Plants”
 - [EIA-63a](#), “Annual Solar Thermal Collector Manufacturers Survey”
 - [EIA-63b](#), “Annual Photovoltaic Mod/Cell Manufacturers Survey”
 - [EIA-5](#), “Quarterly Coal Consumption and Quality Report, Coke Plants”
2. Identify for each frame geographic region and NAICS code where there are coverage problems (if possible).

B. Analysis of Coverage of EIA Frames

Energy-intensive industries are of special importance in evaluating coverage.

MECS/EC Initially use 2002 MECS to evaluate coverage of EIA-860 and EIA-3.

Two-step process:

1. The first step is to match establishments on EIA frame to MECS. If unable to match establishments to MECs, then
2. The second step is to match establishment to Census of Manufacturing (CM).

Rationale for using MECS initially to match establishments

- MECS is a sample (~15,500) of the Census of Manufacturing (NAICS 31-33)
- MECS identifies establishments with cogeneration technology (~1,300 in 1998)
- MECS is used for these two frames because not all variables selected for evaluating coverage are available on CM.

Census of

Manufacturing Use CM to evaluate coverage of EIA-63a, EIA-63b, and EIA-5
Census of Manufacturing (CM) includes NAICS 31-33 and by volume of shipments includes 98% coverage.

Establishments on frame for EIA-63a and EIA-63b are likely in NAICS 334413
Establishments on frame for EIA-5 (Coke Plants) may be in NAICS 324 or 331.
EIA does not collect information from establishments on NAICS codes for these frames.

C. Size of EIA Frames

The number of establishments on the following surveys is for 2002
Approximately 100 establishments are on both EIA-860 and EIA-3
EIA will provide crosswalk between EIA-860 and EIA-3

EIA-860 (CHPs, NAICS 31-33)	1,500
EIA-3	562
EIA-63a	29
EIA-63b	22
EIA-5	20

D. Variables to use to Evaluate Coverage

EIA-860	Total electricity generation (mgwthr) and possible fuel consumption (physical units)
EIA-3	Coal consumption (short tons)
EIA-63a	Total shipments (peak megawatthours) or Value of shipments (\$)
EIA-63b	Total shipments (square feet) or Value of shipments (\$)
EIA-5	Coke and breeze production and coal consumption (all 3 in short tons)

E. Details on Matching and Evaluating Coverage

Causes for difference between EIA and Census frames have been identified in Appendix I.

1. Form EIA-860, "Annual Electric Generator Report"

Frame (EIA-860)

- Approximately 1,500 Establishments on EIA-860 frame
- Frame excludes inactive establishments
- Frame excludes establishments with a nameplate rating of 1 megawatt (1000 kW) or less
- Establishments with primary or secondary NAICS code in the manufacturing sector (31 to 33)
- Respondents self-report NAICS codes

Matching

Criteria to consider

- Company Name
- Establishment Name and address (city, state, zip code)
- Prime mover and cogeneration technology (MECS) used to generate electricity
- Fuel consumption by type of fuel
- 3-digit NAICS code (primary and secondary only for establishments with primary of NAICS 22)
- Electricity generated
- Cogeneration technology

Coverage (Electricity Generated)

U.S. Total (separately for cogen, noncogen, and combined)

$$\text{Count \%} = \frac{\text{Number of Matched Active Establishments on MECS}}{\text{Number of Active Inscope Establishments on MECS}}$$

Unweighted

$$\text{Volume \%} = \frac{\text{Unweighted Volume of Electricity Gen. for Matched Active Establishments on MECS}}{\text{Unweighted Volume of Electricity Gen for All Active Inscope Ests on MECS}}$$

Weighted

$$\text{Volume \%} = \frac{\text{Weighted Volume of Electricity Gen. for Matched Active Establishments on MECS}}{\text{Weighted Volume of Electricity Gen. for All Active Inscope Ests on MECS}}$$

In addition, similar information for Fuel Consumption for select Fuel Types would be of interest.

Disaggregated

Totals Use formula to provide percent of count/volume by geographic region and NAICS code to the extent possible.

Analysis of Matched/Nonmatched Establishments by Count and Volume

Cogen	Matched/Nonmatched	Count	Volume
Cogen	Matched respondents		
	On MECS frame, inscope and not on EIA frame		
	On EIA frame and not on MECS frame		
Non-cogen	Matched respondents		
	On MECS frame, inscope and not on EIA frame		
	On EIA frame and not on MECS frame		

2. Form EIA-3, “Quarterly Coal Consumption and Quality Report, Manufacturing Plants”

Frame

- 562 Establishments on EIA-3 Frame
- Establishments self-report NAICS code
- Crosswalk between EIA-3 and EIA-860 for over 100 establishments

Matching

Criteria to consider

- Company Name
- Establishment Name and address (city, state, zip code)
- 3-digit NAICS code
- Type of coal (Anthracite, Bituminous/Sub, and Lignite) consumed

Coverage (Coal Consumed)

U.S. Total

$$\text{For Count \%} = \frac{\text{Number of Matched Active Establishments on MECS that Consume Coal}}{\text{Number of Active Establishments Inscope on MECS that Consume Coal}}$$

For Volume

$$\text{Option 1 \%} = \frac{\text{Unweighted Volume of Coal Consumed for Matched Active Ests on MECS}}{\text{Unweighted Volume of Coal Consumed for All Active Ests Inscope on MECS}}$$

For Volume Option 2 $\% = \frac{\text{Weighted Volume of Coal Consumed for Matched Active Ests on MECS}}{\text{Weighted Volume of Coal Consumed for All Active Inscope Ests on MECS}}$

Disaggregated

Totals Percent for both count and volume by coal type and if possible 3-digit NAICS code, to the extent possible

Analysis of Matched/Nonmatched Establishments by Count and Volume

Matched/Nonmatched	Count	Volume
Matched respondents		
On MECS frame, inscope and not on EIA frame		
On EIA frame and not on MECS frame		

3. For the following three forms, similar types of evaluation of coverage and analysis at US level only.

3a Form EIA-63a “Solar Thermal Collector Manufacturers Survey”

Frame

- 29 Establishments on EIA-63a frame
- May be classified in NAICS 334413
- Establishments do not report NAICS code

Matching

Criteria to consider

- Company Name
- Establishment Name and address (city, state, zip code)
- Shipments of solar thermal collectors and associated revenue

3b. Form EIA-63b “Annual Photovoltaic Mod/Cell Manufacturers Survey”

Frame

- 22 Establishments on EIA-63b frame
- May be classified in NAICS 334413
- Establishments do not report NAICS code

Matching

Criteria to consider

- Company Name
- Establishment Name and address (city, state, zip code)
- Shipment of photovoltaic modules/cells and associated revenue

3c. Form EIA-5 “Quarterly Coal Consumption and Quality Report, Coke Plants”

Frame

- 24 Establishments on EIA-5 frame
- Establishments may be classified in NAICS 324 or 331
- Establishments do not report NAICS code

Matching

Criteria to consider

- Company Name
- Establishment Name and address (city, state, zip code)

Appendix I: Potential Difference in Frames

The number of establishments on EIA's frame may differ from those on Census frame due to:

- **NAICS classification**
 - Respondents of EIA self-report NAICS codes for their establishments
 - Establishments on EIA-860 have both a primary and secondary NAICS code. It is possible establishments classified in manufacturing sector (NAICS 31 to 33) on the Census of Manufacturing have a primary code of NAICS 22 and a secondary NAICS code in the manufacturing sector on the frame for EIA-860
- **Status** of operations: EIA only includes active establishments whereas the Census of Manufacturing/MECS contain active and inactive establishments
- **Boundary** of establishments: The boundary of the establishments that report on the Census of Manufacturing/MECS may differ from boundary of the establishments that report on EIA surveys, especially EIA-860 and EIA-3. In addition, for establishments on both of these EIA frames, which match CM/MECS by address, it is possible the respondents will report different quantities of fuel consumption. This may, in part, be due to what the establishment considers to be "inside the boundary" For example, if the generator is offsite, then on the MECS and CM fuel consumed by the generator would be excluded whereas on the EIA forms this fuel consumed at the offsite generated (which provides electricity to the plant) would be included.

EIA-860 kW)	All electric generating plants, which have or will have a nameplate rating of 1 megawatt (1000 or more. The operators of jointly-owned plants should be the only respondent for those plants. EIA will provide list of all establishments in manufacturing sector with primary or secondary NAICS 31 to 33.
EIA-3	Manufacturing companies that consume in excess of 1,000 short tons of anthracite, bituminous, subbituminous coal or lignite for uses other than coke production during the year. This includes synfuel plants that use coal as a feedstock, other facilities using coal as a feedstock, and all facilities using coal for gasification/liquefaction.
EIA-63a codes.	Solar thermal collectors may be a product of NAICS 334413. EIA does not collect NAICS
EIA-63b codes.	Photovoltaic modules/cells may be a product of NAICS 334413. EIA does not collect NAICS
EIA-5	Census of Coke plants with potential differences due to difference in boundary of establishment.

Attachment 4: Petroleum Marketing Data Comparison

The EIA-782 survey series collects data on petroleum markets to fulfill legislative mandates from Congress and to provide comprehensive information for evaluating market behavior. It includes three surveys: Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report;" Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report;" and Form EIA-782C, "Monthly Report of Prime Supplier Sales of Petroleum Products Sold for Local Consumption." This article compares the data from the EIA-782 survey series with other sources to assess the quality of the EIA-782 data. Significant differences and trends among data series may indicate the need for changes in data collection and processing, the reporting population, survey or sample design, or may simply reflect conceptual differences across surveys.

The data sources used to compare with the EIA-782 series include:

- The Bureau of Labor Statistics (BLS) Office of Consumer Price Index (CPI) data for retail prices of motor gasoline, diesel fuel, and residential No. 2 fuel oil.
- Form EIA-888, "On-Highway Diesel Fuel Price Survey," for retail prices of diesel fuel.
- Form EIA-878, "Motor Gasoline Price Survey," for retail prices of gasoline.
- Form EIA-821, "Annual Fuel Oil and Kerosene Sales Report," for volumes of distillate and residual fuel oil.
- EIA's Petroleum Supply Annual (PSA) product supplied for volumes of distillate fuel oil, residual fuel oil, and motor gasoline.
- Federal Highway Administration (FHWA) for volumes of motor gasoline.

This article discusses the differences among the data sources and the reasons for variation among the data series. Some differences are irreconcilable and exist among the data sources because of different reporting populations, point in time measurements of market activity, survey design, methodology, and metadata issues relating to product and energy-use sector definitions. Other factors that contribute to differences between data sources include differences in geographic and/or market coverage, product definitions, and units of measure. A more detailed description of each data source is contained in the Notes section at the end of this article.

Price Comparisons

Generally, Tables FE1 - FE3 show that EIA-782 national prices are lower than the BLS, EIA-878, and EIA-888 retail price data series. Differences in the survey methodology across the surveys explain some of the price differences.

- The BLS, EIA-878, and EIA-888 prices include all taxes whereas EIA-782 prices exclude all taxes. For this article, a U.S.-total-weighted Federal and State tax provided by the FHWA is deducted from BLS, EIA-878, and EIA-888 prices. No adjustment was made to the BLS, EIA-878, and EIA-888 prices to remove local sales taxes and other State and local taxes such as environmental discharge and clean up taxes, underground storage tank taxes, and transportation use taxes.

- BLS prices are collected from urban areas whereas EIA-782, EIA-878, and EIA-888 prices are collected from both rural and urban areas across a region or state.
- The EIA-782 uses current volumes while BLS, the EIA-878 and EIA-888 use fixed volumes to compute weighted average prices.
- The EIA-782 prices represent all sales during the month, while BLS prices represent a point in the month. The EIA-878 and the EIA-888 are weekly surveys and represent a point in time in the week. In this article, the annual EIA-878 and EIA-888 prices were calculated using simple arithmetic means.

Residential No. 2 Fuel Oil

Table FE1 shows BLS prices are 3 to 5 percent higher than EIA-782 prices from 1995 through 2001. The difference between the two series has gradually grown each year since 1999. BLS prices are obtained from urban areas only and do not reflect complete geographic coverage for this product. EIA-782 prices are volume weighted price estimates.

Table FE1. U.S. Residential No. 2 Distillate Prices, 1995-2001

Year	(Cents per gallon)		Percentage BLS/ EIA-782
	EIA-782	BLS	
1995	86.7	89.3	1.03
1996	98.9	101.9	1.03
1997	98.4	101.4	1.03
1998	85.2	88.0	1.03
1999	87.6	90.0	1.03
2000	131.1	136.0	1.04
2001	125.0	131.0	1.05

On-Highway Diesel Fuel

Table FE2 shows the annual estimates for EIA-782 and EIA-888 prices from 1995-2001 and for BLS prices from 1998-2001. BLS began publishing retail diesel fuel prices beginning in 1998. EIA-782 and EIA-888 prices track closely, however, the EIA-888 prices range from 9 to 23 percent below the BLS prices. No adjustment was made to the BLS and EIA-888 prices for additional State and/or local taxes relating to environmental regulations and transportation use, so both price series were expected to be higher than the EIA-782 prices.

Table FE2. U.S. Retail On-Highway Diesel Fuel Prices, 1995-2001

Year	(Million Gallons)			Percentage	
	EIA-782	EIA-888	BLS	EIA-888/ EIA-782	BLS/ EIA-782
1995	67.0	67.5	n/a	1.01	n/a
1996	78.8	80.0	n/a	1.02	n/a
1997	74.5	75.8	n/a	1.02	n/a
1998	59.3	60.2	73.2	1.02	1.23
1999	68.5	67.7	76.9	0.99	1.12
2000	103.6	104.6	113.3	1.01	1.09
2001	94.3	95.7	109.0	1.02	1.16

n/a = not available

BLS prices are obtained from urban areas and do not reflect complete geographic coverage for this product. Diesel prices are one of five types of fuel prices that are collected for the motor fuels item strata in calculating the Consumer Price Index. Outlets are selected based upon responses to the BLS Telephone Point of Purchaser Survey (TPOPS) on where the consumer purchased any motor fuels during the survey period. The companies reporting on the EIA-888 survey were selected from the EIA-782 surveys.

Motor Gasoline

Table FE3 shows the annual estimates for EIA-782, EIA-878, and BLS prices from 1990-2001. The price differences were similar across each grade of gasoline so this paper only discusses the prices for regular grade gasoline. For the past 11 years, BLS prices vary between 5 and 9 percent above the EIA-782 prices. EIA-878 prices are between 1 and 5 percent higher than EIA-782 prices during the same time period. Since both BLS and EIA-878 prices contain additional taxes relating to sales taxes, highway use taxes, and other local taxes that could not be removed for this analysis, the EIA-782 prices should be lower than the other series.

Table FE3. U.S. Retail Motor Gasoline Prices, Regular Grade, 1990-2001

(Million Gallons)			Percentage	
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Year	EIA-782	EIA-878	BLS	EIA-878/ EIA-782	BLS/ EIA-782
1990	87.2	n/a	86.9	n/a	1.00
1991	78.1	78.1	82.3	1.00	1.05
1992	75.2	76.2	80.2	1.01	1.07
1993	71.7	73.9	78.0	1.03	1.09
1994	69.4	70.1	73.9	1.01	1.06
1995	72.5	73.7	77.3	1.02	1.07
1996	81.2	85.0	85.7	1.05	1.06
1997	80.0	82.0	85.5	1.03	1.07
1998	62.5	64.4	67.4	1.03	1.08
1999	73.0	75.2	78.2	1.03	1.07
2000	106.6	109.6	112.2	1.03	1.05
2001	99.6	103.2	107.3	1.04	1.08

n/a = not available

Since BLS does not calculate an annual price, a simple average of monthly prices was calculated to obtain the annual average price. The BLS monthly prices are calculated based on approximately 900 price quotes. Approximately 25 to 35 prices are collected from each published geographic area. EIA-782 prices represent sales transactions in all 50 States. There are other limitations in comparing a simple average data series with a volume weighted average price series because of the effect of volume changes throughout the year on the annual price estimate.

The EIA-878 also uses fixed volume weights for calculating prices based on approximately 900 price quotes each week. A simple average of weekly prices was calculated to obtain the annual average price. At the national level, EIA-878 regional prices are weighted based on fixed weights for each region. The EIA-878 sample used from 1998 through 2001 is based on EIA-782 sales volumes from October 1996 through October 1997. The EIA-782 prices utilize all sales transactions throughout the reference month whereas the EIA-878 are point in time estimates.

Volume Comparisons

EIA-782C volumes were compared with volumes reported in the EIA-821, the PSA, and the FHWA. Product supplied in the PSA is an estimate of the demand for petroleum products because it measures the production and adjustments from primary sources of supply for a given time period. It is calculated by adding and subtracting volumes as they are moved into and out of the primary distribution stream. Sales volume data from the EIA-782C and EIA-821 reflect the transfer of product title from a seller to a buyer into those States where the products are locally marketed and consumed. FHWA doesn't collect actual sales data on gasoline and diesel fuel. States report their fuel volumes to FHWA based on the beginning inventory at the terminal facility minus exports plus shipments to the terminal during the

reporting cycle. This difference in survey concepts and methodology underlies some of the differences that exist between the data series.

Distillate Fuel Oil

Table FE4 shows volumes of distillate fuel oil from the EIA-782C, EIA-821, and PSA series from 1990 through 2001. From 1990 through 1992, the EIA-782C volumes are higher than the EIA-821 and PSA volumes. The difference between the EIA-782C series and the PSA series narrows after 1993. An important reason for this change is the addition in 1993 of several importers and traders to the exclusionary list used by respondents when reporting sales on the EIA-782C. For a description of the changes made in 1993 see Changes to Form EIA-782C, "Monthly Report of Petroleum Products Sold into States for Consumption", by Kenneth I. Platto, *Petroleum Marketing Monthly*, May 1993. Respondents to the EIA-782C should exclude sales to any company on the exclusionary list that is not a local distributor, local retailer, or end user. These changes improve the EIA-782C's market coverage and eliminate double counting of volumes sold.

Table FE4. U.S. Distillate Fuel Oil Volumes, 1990-2001

Year	(Million Gallons)			Percentage	
	EIA-782C	EIA-821	PSA	EIA-821/ EIA-782C	PSA/ EIA-782C
1990	50,513	47,827	46,305	0.95	0.92
1991	48,892	45,211	44,775	0.92	0.92
1992	49,971	47,262	45,791	0.95	0.92
1993	48,029	48,290	46,622	1.01	0.97
1994	49,188	50,424	48,477	1.03	0.99
1995	49,332	51,469	49,158	1.04	1.00
1996	51,895	53,379	51,731	1.03	1.00
1997	51,903	54,366	52,665	1.05	1.01
1998	52,371	55,306	53,064	1.06	1.01
1999	54,614	57,573	54,759	1.05	1.00
2000	55,822	59,601	57,217	1.07	1.02
2001	57,344	60,451	58,971	1.06	1.04

Since 1997, EIA-782C volumes have been below both EIA-821 volumes and PSA volumes. This suggests that the EIA-782C may still not have complete coverage on distillate sales. Table FE4 also shows that the difference between the EIA-782C and EIA-821 volumes is greater than the difference between the EIA-782C and the PSA volumes.

One possible source for the widening gap between EIA-821 and EIA-782C volumes is the sales coverage for on-highway use. The EIA-821 on-highway energy use sector shows an increase of approximately 16% since 1997 and is the largest component contributing to the increase in distillate

volumes for that survey during the past 5 years. The EIA-821 volumes for on-highway use are obtained from the Federal Highway Administration and used in place of data reported for this category. However, some EIA-821 respondents may report sales to commercial and institutional fleet vehicles in the commercial use category. If the commercial category contains some misreported transportation volumes, and exogenous data is used to replace the data for on-highway use, then some double counting of distillate volumes for transportation use on the EIA-821 may occur. If sales to fleet vehicles, which are reported in the commercial category, are increasing at approximately the same rate as other distillate sales for other on-highway use, then the amount of double counting of distillate sales in the EIA-821 survey may also be increasing over the past five years, and may contribute to any differences between the EIA-782C and EIA-821 data series.

Motor Gasoline

Table FE5 shows volumes of motor gasoline from the EIA-782C, FHWA and PSA series from 1990 through 2001.

Table FE5. U.S. Motor Gasoline Volumes, 1990-2001

Year	(Million Gallons)			Percentage	
	EIA-782C	PSA	FHWA	PSA/ EIA-782C	FHWA/ EIA-782C
1990	122,574	110,913	115,275	0.90	0.94
1991	120,524	110,192	113,196	0.90	0.94
1992	120,737	111,418	114,854	0.92	0.95
1993	117,886	114,607	116,614	0.97	0.99
1994	120,151	116,523	118,531	0.97	0.99
1995	122,582	119,405	120,876	0.97	0.99
1996	124,243	120,969	123,327	0.97	0.99
1997	125,632	122,901	125,045	0.98	1.00
1998	128,696	126,518	128,504	0.98	1.00
1999	131,066	129,247	132,261	0.99	1.01
2000	129,527	129,876	132,280	1.00	1.02
2001	132,029	131,992	n/a	1.01	n/a

n/a = not available

EIA-782C and PSA

Table FE5 shows that during 1990-1992 PSA motor gasoline volumes are between 8 - 10 percent lower than the EIA-782C volumes. One reason PSA volumes are significantly lower than EIA-782C volumes prior to 1993 is that double counting occurred on the EIA-782C because some respondents were not excluding sales to companies that should have listed on the exclusionary list. A second reason EIA-782C volumes are greater than PSA volumes prior to 1993 was that PSA did not have complete coverage of downstream blending of finished motor gasoline. Blending of fuel ethanol, methanol,

methyl tertiary butyl ether (MTBE), and other blend stock with gasoline often occurs downstream from the refineries. Prior to 1993, this is included in the EIA-782C volumes but not in the PSA volumes. Since 1993, the published PSA motor gasoline volumes include downstream blending at bulk terminals. As a result, the difference between the EIA-782C and the PSA volumes narrows after 1993.

EIA-782C and FHWA

Table FE5 also shows that EIA-782C volumes generally track the FHWA motor gasoline volumes beginning in 1993. Prior to 1993, FHWA volumes were reported by wholesale distributors to State motor fuel tax agencies that compile data on gasoline taxes and these data were reported by the State agencies to FHWA. In 1993, the point of Federal tax collection was moved upstream from the last wholesale sale to the terminal operators. This change in the reporting volumes results in more accurate reporting of the FHWA volumes.

Residual Fuel Oil

Table FE6 shows volumes of residual fuel oil from the EIA-782C, EIA-821, and PSA from 1990 through 2001.

Table FE6. U.S. Residual Fuel Oil Volumes, 1990-2001

Year	(Million Gallons)			Percentage	
	EIA-782C	EIA-821	PSA	EIA-821/ EIA-782C	PSA/ EIA-782C
1990	18,677	19,233	18,838	1.03	1.01
1991	17,856	17,632	17,750	0.99	0.99
1992	16,317	16,199	16,822	0.99	1.03
1993	13,555	15,064	16,559	1.11	1.22
1994	12,753	14,825	15,649	1.16	1.23
1995	9,623	12,318	13,058	1.28	1.36
1996	10,639	13,257	13,041	1.25	1.23
1997	10,583	12,504	12,213	1.18	1.15
1998	11,513	14,730	13,600	1.28	1.18
1999	10,259	13,328	12,726	1.30	1.24
2000	9,760	13,211	13,966	1.35	1.43
2001	10,285	13,546	12,435	1.32	1.21

EIA-782C vs. PSA and EIA-821

Table FE6 shows that the difference between the EIA-782C and the other two series widen after 1993 and reach its highest level in 2000 with PSA volumes exceeding the EIA-782C volumes by 43% and

the EIA-821 exceeding the EIA-782C volumes by 35%. The large and continuous divergence between the EIA-782C and the other two series suggests that the EIA-782C may be missing some coverage of residual fuel oil sales. In addition, there may have been some misreporting by respondents in the PSA surveys during this time period.

During 1999 through 2001, some importers misreported their imports of residual fuel oil on the EIA-814, "Monthly Imports Report." Their imports of unfinished oils were combined with residual fuels and both products were reported as residual fuel oil. This may be due to the misconception by respondents that imports reported to EIA should match the same import volumes reported to the U.S. Customs office. When a shipment reaches the United States, the importer of record will complete Customs Form 7501, "Entry Summary" (CF-7501). CF-7501 is used to validate data reported on Form EIA-814. CF-7501 does not have a category for unfinished oils so imports of unfinished oils are mistakenly reported as residual fuel oil. It is unclear how long the reporting of unfinished oils as residual fuel oil has been occurring during the past 10 years. The reported imports of unfinished oil as residual fuel oil by some PSA respondents contributes to the higher PSA volumes for residual fuel oil. This is notable in the past 2 years as imports of residual fuel oil reached their highest levels and account for 39 percent of product supplied for residual fuel oil in 2000 and 47 percent in 2001. A data correction for 2001 PSA residual fuel oil volumes moved some volumes from imports of residual fuel oil to imports of unfinished oils. This resulted in reducing the gap between the EIA-782C and PSA residual fuel volumes. No other data corrections were made to the 1999 and 2000 PSA volumes.

Another reason EIA-782C volumes are below the other series is that some firms may be missing from the reporting population of the EIA-782C survey. Missing firms from the EIA-782C will undercount sales and contribute to the difference between the series as the percentage of imports that comprise product supplied of residual fuel oil increases. The EIA-782C has been below both other data series for the past nine years and the gradual widening of this disparity, even after the revision of the 2001 PSA volumes, indicates that the EIA-782C is missing some coverage of residual fuel oil.

Summary

One method of evaluating the quality of petroleum market prices and volumes is to compare EIA-782 series data with other sources. Differences among data sources could lead to a review and possible update of the reporting populations for the EIA-782 surveys and research on alternatives for adjusting the data. Other differences across data sources indicate differences in survey methodology and conceptual differences with data collection.

Notes

Data Sources

The Form EIA-782A, "Refiners'/Gas Plant Operators' Monthly Petroleum Product Sales Report," collects monthly price and volume data at the State level for 14 petroleum products for various retail

and wholesale marketing categories. It is a census of refiners and gas plant operators. The frame is updated on an ongoing basis using respondent lists from surveys such as the Form EIA-810, "Monthly Refinery Report;" the Form EIA-816, "Monthly Natural Gas Liquids Report;" and industry trade publications. Currently, 110 companies respond to the EIA-782A survey.

The Form EIA-782B, "Resellers'/Retailers' Monthly Petroleum Product Sales Report," is sent to a sample of resellers and retailers of motor gasoline, distillate, propane, and residual fuel oil. Respondents to Form EIA-863, "Petroleum Product Sales Identification Survey," are used as the sampling frame of resellers and retailers for the EIA-782B. Firms having 5 percent or more of sales in a State are selected with certainty. The remaining companies on the frame are sampled by geographic area, product, type of sale, and by probability proportional to size. The EIA-782B sample includes approximately 2,000 companies.

The Form EIA-782C, "Monthly Report of Prime Supplier Sales of Petroleum Products Sold for Local Consumption," collects volumes of prime supplier sales of selected petroleum products into States where they are locally sold and consumed. A prime supplier is a firm that produces, imports, or transports any of the selected petroleum products across State boundaries and local marketing areas and sells the product to local distributors, local retailers, or end users. This survey provides a measure of consumption in most States. Currently, 183 firms respond to the EIA-782C survey.

Data collected on the Forms EIA-782A, EIA-782B, and EIA-782C are published in the Petroleum Marketing Monthly (PMM) and the Petroleum Marketing Annual (PMA).

In addition, production, import, and export data collected by EIA's Petroleum Division are published in the Petroleum Supply Monthly (PSM) and the Petroleum Supply Annual (PSA). The Petroleum Division uses the Petroleum Supply Reporting System (PSRS) for data collection. The PSRS is composed of a family of data collection survey forms, data processing systems, and publications systems. Detailed data on refinery and natural gas plant operations, bulk terminal and pipeline stocks, petroleum products imports, and movements of petroleum products among Petroleum Administration for Defense (PAD) districts are collected monthly. Figures for product supply originate from Forms EIA-810, "Monthly 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-816, "Monthly Natural Gas Liquids Report;" and EIA-817, "Monthly Tanker and Barge Movement Report." Aggregate export data obtained from the Bureau of the Census are also included in computations for the PSM and PSA. The PMA and the PSA may contain revisions of the data published in the PMM and the PSM, respectively, due to late submissions or revisions to the monthly data.

The Form EIA-821, "Annual Fuel Oil and Kerosene Sales Report," collects data on the sales to end users of distillate fuel oil, residual fuel oil, and kerosene. The data are used to determine the level of sales by energy-use category and product at the State, regional, and national levels. The sample size is approximately 4,000. The sampling frame for the EIA-821 is also derived from the respondents to Form EIA-863. The EIA-863 is a quadrennial census used to collect information on size, type, and geographic location of firms selling petroleum products. Data from the Federal Highway Administration (FHWA) of the U.S. Department of Transportation replace EIA-821 data reported as on-highway diesel sales.

The Highway Statistics Division of the FHWA collects information related to highway transportation. Sales volumes of motor gasoline are published on a calendar year basis and are a cumulative tabulation of gross gallons of gasoline reported by wholesale distributors to State motor fuel tax agencies. The FHWA collects information on finished motor gasoline, with no distinction made among motor gasoline grades. The data include gasoline for both highway and non-highway use. The FHWA includes gasohol but excludes exports, fuels for military use, and dealer transfers.

The Bureau of Labor Statistics (BLS) publishes the aggregate index for household fuels and its component indexes for electricity and natural gas, as well as the motor fuels. The component index for fuel oil and diesel fuel are only published at the national level. These retail prices are collected monthly by BLS representatives in the urban areas, and support the estimation of the Consumer Price Index (CPI). The CPI uses fixed volume weights to measure the change in price over time for a defined market basket of goods and services bought by urban consumers. It measures the percent change in consumers' expenditures on a fixed list of items whose values and qualities do not change over time. The base period weight of the fuels indexes for the time period evaluated represents the out-of-pocket expenditures on household fuels as reported in the Consumer Expenditure Survey (1993-1995). Approximately 2,400 prices are collected for all three grades of gasoline in approximately 87 urban areas across the country and include all taxes directly associated with the purchase and the use of the items. The 87 areas cover 39 States and the District of Columbia.

Attachment 5: U.S. Natural Gas Markets: Mid-Term Prospects for Natural Gas Supply

Balancing Items in EIA's Natural Gas Data Series

In an ideal statistical world, measured supply of natural gas would equal measured disposition (consumption). In a large and diverse national system of supply and disposition, however, the supply and disposition of natural gas cannot be tracked and measured exactly. When physical and statistical measurements of natural gas supply and disposition activities do not match, the difference is called the balancing item. The term is calculated as the difference, for a report period, between the sum of the components of supply and the sum of the components of natural gas disposition. The formula for the United States is:

$$\begin{aligned} & \text{(Dry gas production + Supplemental gaseous fuel supply} \\ & \text{+ Net imports + Net storage withdrawals + Balancing} \\ & \text{item)} = \text{(Lease and plant fuel consumption + Pipeline fuel} \\ & \text{consumption + Residential, commercial, industrial, and} \\ & \text{electric utility consumption)}. \end{aligned}$$

The balancing item may be positive or negative, because the sum of supply measures may be larger than the sum of disposition measures, or vice versa (see figure). The signs may change from month to month and year to year.

The difference between measured supply and disposition may be due to unmeasured sources of supply or disposition or to data reporting problems for any of the measured sources. The balancing item for any given year is customarily revised to a smaller value when final annual data replace the monthly data. One reason for this change is that several pieces of the supply and disposition system are only reported annually and are estimated for the more recent monthly periods. Another reason is that monthly consumption data series for end-use sectors are calculated from a sample of companies making end-use deliveries and include sampling uncertainty, whereas annual data are collected from all known respondents. Other reasons are that more time usually is available for the resolution of data quality and nonresponse issues for the annual series.

The annual balancing item has never been zero. The absolute values of annual balancing items since 1977 have ranged from 41 billion cubic feet (1977) to 897 billion cubic feet (1999). In most years the annual value has been negative, indicating that reported supply exceeded reported consumption. Within a given year, monthly balancing item measures are often positive in the early months but negative in the later months of the year. This pattern may relate to a lag in delivery reports during the peak winter heating season.

The balancing item measures for 2000 and the first three quarters of 2001 have been large and, in addition, have had opposite signs. Most analysts of natural gas industry trends in 2000 have assumed that consumption activity was underreported in 2000. For 2001, analysts have hypothesized that consumption estimates are too large and that production volumes are underreported. For the year 2000 and the first three quarters of 2001, the absolute values of the balancing items averaged 3.7 percent and 2.6 percent of total consumption, respectively. Those levels are significant when analysts seek to understand active, volatile markets.

Attachment 6: Evaluation of the EIA-910 Survey Residential and Commercial Natural Gas Prices

Thursday October 15 at 3:15 pm Breakout session #5

Introduction

The purpose of the Form EIA-910, “Monthly Natural Gas Marketers Survey,” is to capture the price of natural gas sold by marketers to residential and commercial customers. Since the introduction of customer choice programs in these two sectors, EIA’s coverage of these price data has declined. This survey is meant to fill that gap, by going to the marketers that sell the gas and asking them to report volume sold and revenue so that EIA can report a volume weighted price. The survey currently goes to marketers in five (5) states with active customer choice programs. There is no sampling, and the number of active marketers varies by state from 8 or less to over 30. The survey has been in place since August 2001.

The purpose of this report is to evaluate the quality of the EIA-910 data that EIA received for calendar year 2002. The Natural Gas Division will examine the findings of this evaluation, decide upon the necessity and feasibility of expanding the survey beyond the five states already being surveyed, and will make other possible changes to the collection and dissemination of the EIA-910. The evaluation is divided into three (3) related tasks:

1. Evaluate the coverage of the EIA-910 volume data: How much of the “missing” price related volume did the EIA-910 recover.
2. Evaluate the quality of the EIA-910 price data: How accurate are the data that EIA has collected from marketers?
3. Provide options for expanding the survey to marketers who sell in states in addition to the five states currently covered by the survey. Is it necessary, and resource efficient, to expand the survey to additional states?

Evaluating the Coverage

The Form EIA-857, “Monthly Report of Natural Gas Purchases and Deliveries to Consumers,” collects the volume in thousand cubic feet (mcf) of natural gas sold on-system by the Local Distribution Company (LDC) as well as the volume transported by the LDC but sold by marketers. The percent of on-system sales is very small in Georgia, due to the way in which deregulation operates in that state. In the other four states, the percentage is relatively flat for Residential sales, but shows general variability and some seasonality for commercial. (Further analysis of the 857 data is outside of the scope of this project, which focuses on the 910 survey data.) The volume of transported gas as collected on the 857 survey offers a benchmark for the volume reported on the EIA-910 survey. Ideally, these amounts should track closely, with only billing cycle differences. Staff working on the EIA 910 survey compare these volumes on a regular basis, using plots similar showing both volumes on a monthly basis. For this study, we also looked at tables of annual volumes, which will lessen billing-cycle impacts.

Table One – Ratio of 910 Volume (mcf) to 857 Transported Volume (mcf) for calendar year 2002

	GA	MD	NY	OH	PA
Residential	.80	.77	.86	1.15	1.26
Commercial	.89	1.03	.90	.96	1.69
Combined	.82	.96	.89	1.06	1.57

Based on data in system as of July 2, 2003

All of these approaches reach the same conclusion, namely that although the match is not perfect, it is deemed to be acceptable in all states. (HOWEVER, NO STATISTICAL TESTS WERE DONE TO COMPARE THESE VOLUMES. THE 910 VOLUMES REPRESENT A COMPLETE CENSUS WITH NO SAMPLING. THE 857 HAS SAMPLING, BUT ONLY AGGREGATE STATE TOTALS WERE USED HERE) The largest differences are in Pennsylvania, where the 910 volumes averaged well above those from the 857. This is still the case after careful editing had reduced this number by removing double counting by two marketers that had merged, and asking one or more survey respondents to check if they were including industrial customers. Other possible reasons for the 910 volumes being high are sales across state lines or counting sales between marketers. The volumes tend to be low in Georgia, which could indicate that the 910 survey is missing some of the data. The combined residential and commercial volumes were calculated in an attempt to determine whether misreporting between these two categories was occurring, but that does not appear to be the case for Georgia nor Pennsylvania. However, these volume comparisons only serve as a check, since the volumes from the 910 survey are not published.

The respondent-level records were reviewed to determine the extent of missing data. In only a few cases were there gaps in a respondent's reporting, although missing the most recent month was most common. All of these were known to the survey staff and were on the list of non-respondents. This would contribute slightly to the 910 volumes being low since the 910 data has no imputation for volume.

Price Quality

Response rates were good, with a minimum unit response rate of 89% and only one volume weighted response rate below 92%. The weighted response rate is calculated using the most recent three months of market share. These formulas were reviewed and deemed to be appropriate.

The edit rules have critical flags for the situations that have mathematical errors, such as volumes being reported with no revenue, or one or more customers but no volumes. The warning flags have two categories, with critical warnings being likely to be in error, such as a residential price over \$25.00 per therm. Non-critical warning flags are generated for large changes in number of customers or market share. These rules seem reasonable.

At the respondent level, the 910 prices do exhibit more variability in some states than in others. Respondent level commodity prices were reviewed, and all were above city-gate prices. In aggregate, the prices do look reasonable and believable, even in Pennsylvania. (HOWEVER, THE EDITS WERE NOT ACTUALLY TESTED WITH REAL OR SIMULATED DATA.)

Price Estimates

The prices for both the Forms EIA-857 and the EIA-910 are based on total revenues for all customers divided by total volumes during a given month. (This is the customary approach for obtaining the volume-weighted average price for most EIA surveys.) In Georgia, the taxes and distribution charges are collected on the EIA-910. In other states, taxes and distribution charges are collected on the EIA-857, and any tax and distribution data that were supplied by EIA-910 respondents outside of Georgia were ignored. The formula for the integrated price for each state is the weighted average of the 857 and 910 prices, with the weights determined by the 857 volumes transported and sold. Appendix C contains this in more detail, but an important point is that the EIA-910 volumes are not used in the final weighting.

For the most part, the marketer price is lower for commercial, little different for residential, but higher for both in Georgia.

Table Two – Prices (including distribution charges and taxes) for calendar year 2002 and net impact of moving to an integrated price.

	GA	MD	NY	OH	PA
Residential 857	8.67	9.94	9.95	7.45	9.45
910	9.95	8.91	8.40	7.63	9.31
Integrated	9.89	9.71	9.74	7.52	9.44
Integrated - 857	+1.22	- .23	- .21	+ .08	- .01
Commercial 857	6.53	8.28	8.13	6.88	8.54
910	8.25	6.18	5.50	5.95	6.00
Integrated	8.10	6.81	6.51	6.29	7.42
Integrated - 857	+1.57	-1.47	-1.62	- .59	-1.12

Dollars per mcf, Based on data in system as of 7-2-03

Tables 21 and 22 of the May 2003 Natural Gas Monthly (released on July 22) incorporate the integrated prices for the five states. Comparing the April and May publications we are able to assess the impact on the U.S. average price of having the 910 survey operating in the five states. This shows that the net impact of moving to an integrated price for the annual 2002 prices was an increase of 6 cents for Residential (from \$7.79 to \$7.85 per mcf.) Since data for 2002 were revised in other states recently for unrelated reasons, we do not have the exact impact for commercial. However, total change shows a decrease of 14 cents for commercial (from \$6.70 to \$6.56 per mcf), which is somewhat impacted by unrelated changes.

Lessons Learned:

- The initial form apparently was confusing to respondents in terms of the taxes and distribution, since many reported values here even though they were not in Georgia. The form was later modified to reduce confusion.
- The volume differences in Pennsylvania illustrate once again the problems of dealing with new respondents in a rapidly changing industry. We did have problems with identical data being reported after two firms merged, and we may (or maybe not) have had data reported twice if sold through multiple marketers.
- This is likely to be an evolving and challenging survey, and may require additional field-testing with selected respondents.

Criteria for Changing Survey Coverage

Expansion Criteria: The following strategy is recommended for deciding how to expand the EIA-910 to cover additional states. The decision whether to expand the survey will be based on the availability of additional resources.

Consider expansion in the commercial sector first, because the percent off system for commercial is much higher than it is for residential. In addition, the data from the current 910 shows that there are differences in prices between on system sales and off system sales in all five states surveyed. Hence, the potential biases in EIA commercial price estimates are greater. Once states have been selected to be included in the EIA-910 to improve commercial coverage, their residential coverage is automatically improved. Finally, consider expansion in the residential sector to make sure the few states for which coverage of the residential prices is important are included.

Commercial

The recommended criterion is an assessment of the likely change in EIA's estimate of prices paid by consumers in the commercial sector, or equivalently the possible bias of EIA's current price data. Table A8 shows that the states with the highest percentage of commercial off-system sales that are not currently in the EIA-910 are the District of Columbia (80%), Illinois (58.9%), Florida (43.4%), Rhode Island (42%), and New Jersey (40.9). All other states have percent off-system of less than 40%, however even this percentage of off-system sales may be leading to substantial biases in EIA price information. Georgia, Maryland, New York and Pennsylvania all have price differences in the neighborhood of \$2.50. Ohio has a price difference of about \$1.00

Under the assumption that there is a 2.50 price difference between on system and off system sales; the bias in EIA's current commercial price estimate would be about \$2.00 for the District of Columbia, \$1.47 for Illinois, \$1.08 for Florida, \$1.05 for Rhode Island, and \$1.02 for New Jersey. However, Ohio shows a price difference of only about \$1.00, and if this were the case elsewhere the bias would be less. Tables A8 show that EIA's current state level commercial price estimates have a *potential* bias of more than \$.50 for nearly 20 states, although the *actual* bias in any state is currently unknown.

A reasonable approach is to go down the list of states in Tables A8 in decreasing order of bias to add states to the EIA-910. Other important information to consider is the number of marketers in a state that would need to be surveyed, as well as the contribution of off-system sales in that particular state to the U.S. total. Of the states currently not covered by the EIA-910, Illinois, California, Michigan, and New Jersey rank two, four, five, and six, respectively, in their contribution to the U.S. volume of commercial sales. One reason to consider the volumes of gas sold in the state is that larger volume states will have a greater impact on the U.S. total price. However of these states Michigan has the lowest percent off-system (36.5%) and has a likely price bias of \$.36 to \$.91 in the commercial sector (Table Three). All of these states are good candidates for inclusion in the EIA-910 on the basis of potential bias at the state level.

Table Three – Commercial Candidates

Jurisdiction	Volume of Off-System Sales in 2001 (mmcf)	Rank by Volume	Percent of Off-System Sales for 2001	Rank by Percent
Illinois	111,421	2	58.9	4
New Jersey	55,889	6	40.9	9
California	92,001	4	37.4	13
Michigan	63,405	5	36.5	15
Texas	26,191	10	14.7	33
District of Columbia	12,848	17	77.6	2

Source: Table 17, 2001 *Natural Gas Annual*

Residential

Tables A8 show that the states with the highest percentage of residential off-system sales that are not currently in the EIA-910 are the District of Columbia (24.62%), Nebraska (23.09%), Illinois (8.63%), Virginia (8.31%), and Wyoming (7.39%). All other states have percent off-system of less than 5%. Georgia (a special situation) has an average price difference between the 910 and the 857 of \$2.40. For New York and Maryland the price difference is somewhat less than \$2.00, and for Ohio and Pennsylvania, the price difference is negligible.

Under the assumption that there is a \$2.00 price difference in the five candidate states listed above; the bias in EIA's current residential price estimate would be about \$.50 for the District of Columbia and Nebraska, and \$.17 for Illinois, Virginia, and Wyoming (Tables A8). However, the bias would be less if the price difference were less, and two of our states showed essentially no price difference for residential. The bias in the price estimates for other states would be less than \$.10. Of these five states the District of Columbia, and Illinois will most likely be included in the EIA-910 to capture Commercial sector prices. Nebraska would be about 11th to include in the EIA-910 based solely on Commercial sector price. It may be worthwhile to include Nebraska because it is needed in both residential and commercial. This analysis indicates that biases in the commercial sector data are the most important to address by expanding the EIA-910 survey.

It is also interesting to consider the states that have a high percentage of natural gas customers participating in choice program. Table Four shows the information for the five jurisdictions that are not covered by the survey that have at least ten percent (or close to it) of all gas customers in that state participating in a choice program.

Table Four – Residential Candidatesⁱ

Jurisdiction	Percent of 2001 Total Customers Eligible	Number of Customers Participating in 2001	Percent of Total 2001 Total Eligible Customers Participating	National Rank of Total 2001 Eligible Customers Participating
District of Columbia	100	26,438	19.5	4
Virginia	57.8	81,042	8.6	8
Michigan	47.6	332,244	11	7
Wyoming	37.2	48,339	37.2	2
Nebraska	15.4	73,228	15.4	6

Source: http://www.eia.doe.gov/oil_gas/natural_gas/restructure/state/us.html

Michigan and Virginia each have six active marketers, the District five, and Nebraska and Wyoming, four. The District has completed District-wide unbundling. Virginia is in the process. Michigan, Nebraska, and Wyoming are in the pilot/partial unbundling stage. (Without checking out the lists for each of these states, our guess there is marketer overlap between the District and Virginia and maybe Nebraska and Wyoming.)

Deletion Criteria: If the Natural Gas Division decided upon expansion criteria, then it could use the same criteria to decide whether to delete a state from the EIA-910 survey. However, at the present time, of the 5 states in the sample, Ohio would have the smallest price bias if it were dropped from the EIA-910. The residential prices would not change appreciably because there is little difference between on-system and off-system prices. If the EIA-910 survey was discontinued in Ohio, commercial prices in Ohio would have a bias of \$.58. Even though Ohio has a high percentage of off-system sales (58.2%) the price difference is relatively small (\$1.06). Because of the high percentage of off-system sales, the possibility of changing prices, and the difficulty of starting up the EIA-910 once it is dropped, it we think that it is premature to exercise the deletion criteria at the present time.

Tables and Figures

This is a subset of a larger report, and only some of the tables and figures are contained here, but they were NOT renumbered.

- Table A2 - possible bias – entry is simple product of row and column.
- Table A8 – two pages possible bias for residential and commercial.
- Figures 16 and 17 – price comparison by month, for residential and commercial
- Figure 30 - plot of total volume of natural gas vs percent off-system for commercial

Appendix C contains formulas.

Questions for the Committee:

- How to select new states. Tables of bias present possible impact on integrated price, but need to guess at price difference. Any ideas for estimating price difference between utility and marketer in a state?
- Do people want state-level prices? Or does it need to be a smaller area?
- Should EIA show both 910 and 857 prices, or is the average OK?
- Variance calculations treats 910 as a constant. Is this OK?

Appendix A – Tables

Table A2

Bias Table

Bias (In Dollars) - Difference Between On System Price (857) & Actual Integrated Price (857 and 910)

Potential Price Difference Between Marketer Price (910) & On-System Price (857)	Percent (Off System)									
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
\$0.25	\$0.03	\$0.05	\$0.08	\$0.10	\$0.13	\$0.15	\$0.18	\$0.20	\$0.23	\$0.25
\$0.50	\$0.05	\$0.10	\$0.15	\$0.20	\$0.25	\$0.30	\$0.35	\$0.40	\$0.45	\$0.50
\$0.75	\$0.08	\$0.15	\$0.23	\$0.30	\$0.38	\$0.45	\$0.53	\$0.60	\$0.68	\$0.75
\$1.00	\$0.10	\$0.20	\$0.30	\$0.40	\$0.50	\$0.60	\$0.70	\$0.80	\$0.90	\$1.00
\$1.25	\$0.13	\$0.25	\$0.38	\$0.50	\$0.63	\$0.75	\$0.88	\$1.00	\$1.13	\$1.25
\$1.50	\$0.15	\$0.30	\$0.45	\$0.60	\$0.75	\$0.90	\$1.05	\$1.20	\$1.35	\$1.50
\$1.75	\$0.18	\$0.35	\$0.53	\$0.70	\$0.88	\$1.05	\$1.23	\$1.40	\$1.58	\$1.75
\$2.00	\$0.20	\$0.40	\$0.60	\$0.80	\$1.00	\$1.20	\$1.40	\$1.60	\$1.80	\$2.00
\$2.25	\$0.23	\$0.45	\$0.68	\$0.90	\$1.13	\$1.35	\$1.58	\$1.80	\$2.03	\$2.25
\$2.50	\$0.25	\$0.50	\$0.75	\$1.00	\$1.25	\$1.50	\$1.75	\$2.00	\$2.25	\$2.50
\$2.75	\$0.28	\$0.55	\$0.83	\$1.10	\$1.38	\$1.65	\$1.93	\$2.20	\$2.48	\$2.75
\$3.00	\$0.30	\$0.60	\$0.90	\$1.20	\$1.50	\$1.80	\$2.10	\$2.40	\$2.70	\$3.00

The percentages (off system) for total commercial and residential deliveries within individual states are given on two worksheets within this file. These values were found in Consumption Table 17 of the Natural Gas Annual (2001). The expected bias in New York, for example, based on a potential price difference (between the EIA-910 and the EIA-857) of \$1.50 would be about \$.75. This is the estimated amount by which EIA's current published price (EIA-857) exceeds the actual integrated price.

Dollars per MCF for Annual Data from 2002

States	Average EIA-910 Price		Average EIA-857 Price		Difference in Average Prices	
	Residential	Commercial	Residential	Commercial	Residential	Commercial
Georgia	\$11.99	\$9.36	\$9.59	\$6.88	\$2.40	\$2.47
Maryland	\$9.31	\$6.28	\$11.26	\$8.73	\$1.95	\$2.44
New York	\$8.85	\$6.03	\$10.83	\$8.57	\$1.98	\$2.54
Ohio	\$8.16	\$6.26	\$8.17	\$7.32	\$0.01	\$1.06
Pennsylvania	\$10.54	\$6.36	\$10.53	\$8.98	\$0.01	\$2.62

Based on the above table, citing the reported prices from the EIA-857 and the EIA-910, the difference in price for the commercial sector in the state of Georgia is \$2.47. Combined with the knowledge that 80% of the respondents in Georgia are off system, we can conclude from the Bias Table that EIA would over estimate the actual price by close to \$1.80.

The Bias Table is a tool that can be used to answer the following question: Should EIA expand the EIA-910 to other states? One could create a "rule of thumb" based on this table, deciding to add states to the EIA-910 if the expected bias exceeds \$0.50, for example, which is the portion of the table highlighted in yellow.

Appendix A – contd.
Table A8

Ranked States Residential

Residential Bias (In Dollars)

States	Percent Off System	Price Difference												
		\$0.00	\$0.25	\$0.50	\$0.75	\$1.00	\$1.25	\$1.50	\$1.75	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00
Georgia	84.17%	\$0.00	\$0.21	\$0.42	\$0.63	\$0.84	\$1.05	\$1.26	\$1.47	\$1.68	\$1.89	\$2.10	\$2.31	\$2.53
Ohio	30.54%	\$0.00	\$0.08	\$0.15	\$0.23	\$0.31	\$0.38	\$0.46	\$0.53	\$0.61	\$0.69	\$0.76	\$0.84	\$0.92
Maryland	26.44%	\$0.00	\$0.07	\$0.13	\$0.20	\$0.26	\$0.33	\$0.40	\$0.46	\$0.53	\$0.59	\$0.66	\$0.73	\$0.79
New York	12.24%	\$0.00	\$0.03	\$0.06	\$0.09	\$0.12	\$0.15	\$0.18	\$0.21	\$0.24	\$0.28	\$0.31	\$0.34	\$0.37
Pennsylvania	10.75%	\$0.00	\$0.03	\$0.05	\$0.08	\$0.11	\$0.13	\$0.16	\$0.19	\$0.21	\$0.24	\$0.27	\$0.30	\$0.32
		\$0.00												
District of Columbia	24.62%	\$0.00	\$0.06	\$0.12	\$0.18	\$0.25	\$0.31	\$0.37	\$0.43	\$0.49	\$0.55	\$0.62	\$0.68	\$0.74
Nebraska	23.09%	\$0.00	\$0.06	\$0.12	\$0.17	\$0.23	\$0.29	\$0.35	\$0.40	\$0.46	\$0.52	\$0.58	\$0.63	\$0.69
Illinois	8.63%	\$0.00	\$0.02	\$0.04	\$0.06	\$0.09	\$0.11	\$0.13	\$0.15	\$0.17	\$0.19	\$0.22	\$0.24	\$0.26
Virginia	8.31%	\$0.00	\$0.02	\$0.04	\$0.06	\$0.08	\$0.10	\$0.12	\$0.15	\$0.17	\$0.19	\$0.21	\$0.23	\$0.25
Wyoming	7.39%	\$0.00	\$0.02	\$0.04	\$0.06	\$0.07	\$0.09	\$0.11	\$0.13	\$0.15	\$0.17	\$0.18	\$0.20	\$0.22
West Virginia	4.55%	\$0.00	\$0.01	\$0.02	\$0.03	\$0.05	\$0.06	\$0.07	\$0.08	\$0.09	\$0.10	\$0.11	\$0.13	\$0.14
Kentucky	4.21%	\$0.00	\$0.01	\$0.02	\$0.03	\$0.04	\$0.05	\$0.06	\$0.07	\$0.08	\$0.09	\$0.11	\$0.12	\$0.13
Michigan	2.60%	\$0.00	\$0.01	\$0.01	\$0.02	\$0.03	\$0.03	\$0.04	\$0.05	\$0.05	\$0.06	\$0.06	\$0.07	\$0.08
New Jersey	2.43%	\$0.00	\$0.01	\$0.01	\$0.02	\$0.02	\$0.03	\$0.04	\$0.04	\$0.05	\$0.05	\$0.06	\$0.07	\$0.07
Arizona	2.16%	\$0.00	\$0.01	\$0.01	\$0.02	\$0.02	\$0.03	\$0.03	\$0.04	\$0.04	\$0.05	\$0.05	\$0.06	\$0.06
Indiana	1.86%	\$0.00	\$0.00	\$0.01	\$0.01	\$0.02	\$0.02	\$0.03	\$0.03	\$0.04	\$0.04	\$0.05	\$0.05	\$0.06
Florida	0.77%	\$0.00	\$0.00	\$0.00	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.02	\$0.02	\$0.02	\$0.02	\$0.02
California	0.64%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.01	\$0.02	\$0.02	\$0.02
Massachusetts	0.15%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Wisconsin	0.10%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Oklahoma	0.04%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Louisiana	0.04%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Colorado	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
New Mexico	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Alabama	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Alaska	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Arkansas	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Connecticut	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Delaware	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Hawaii	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Idaho	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Iowa	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Kansas	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Maine	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Minnesota	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Mississippi	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Missouri	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Montana	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Nevada	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
New Hampshire	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
North Carolina	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
North Dakota	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Oregon	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Rhode Island	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
South Carolina	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
South Dakota	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Tennessee	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Texas	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Utah	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Vermont	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Washington	0.00%	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Appendix A – contd.

Table A8 – contd.

Ranked States Commercial

Commercial Eas (In Dollars)

States	Percent Off System	Price Difference												
		\$0.00	\$0.25	\$0.50	\$0.75	\$1.00	\$1.25	\$1.50	\$1.75	\$2.00	\$2.25	\$2.50	\$2.75	\$3.00
Georgia	80.00%	\$0.00	\$0.20	\$0.40	\$0.60	\$0.80	\$1.00	\$1.20	\$1.40	\$1.60	\$1.80	\$2.00	\$2.20	\$2.40
Maryland	67.40%	\$0.00	\$0.17	\$0.34	\$0.51	\$0.67	\$0.84	\$1.01	\$1.18	\$1.35	\$1.52	\$1.69	\$1.85	\$2.02
Ohio	58.20%	\$0.00	\$0.15	\$0.29	\$0.44	\$0.58	\$0.73	\$0.87	\$1.02	\$1.16	\$1.31	\$1.46	\$1.60	\$1.75
New York	54.30%	\$0.00	\$0.14	\$0.27	\$0.41	\$0.54	\$0.68	\$0.81	\$0.95	\$1.09	\$1.22	\$1.36	\$1.49	\$1.63
Pennsylvania	37.00%	\$0.00	\$0.09	\$0.19	\$0.28	\$0.37	\$0.46	\$0.56	\$0.65	\$0.74	\$0.83	\$0.93	\$1.02	\$1.11
District of Columbia	77.60%	\$0.00	\$0.19	\$0.39	\$0.58	\$0.78	\$0.97	\$1.16	\$1.36	\$1.55	\$1.75	\$1.94	\$2.13	\$2.33
Illinois	58.90%	\$0.00	\$0.15	\$0.29	\$0.44	\$0.59	\$0.74	\$0.88	\$1.03	\$1.18	\$1.33	\$1.47	\$1.62	\$1.77
Florida	43.40%	\$0.00	\$0.11	\$0.22	\$0.33	\$0.43	\$0.54	\$0.65	\$0.76	\$0.87	\$0.98	\$1.09	\$1.19	\$1.30
Rhode Island	42.00%	\$0.00	\$0.11	\$0.21	\$0.32	\$0.42	\$0.53	\$0.63	\$0.74	\$0.84	\$0.95	\$1.05	\$1.16	\$1.26
New Jersey	40.90%	\$0.00	\$0.10	\$0.20	\$0.31	\$0.41	\$0.51	\$0.61	\$0.72	\$0.82	\$0.92	\$1.02	\$1.12	\$1.23
Alaska	39.50%	\$0.00	\$0.10	\$0.20	\$0.30	\$0.40	\$0.49	\$0.59	\$0.69	\$0.79	\$0.89	\$0.99	\$1.09	\$1.19
Kansas	37.90%	\$0.00	\$0.09	\$0.19	\$0.28	\$0.38	\$0.47	\$0.57	\$0.66	\$0.76	\$0.85	\$0.95	\$1.04	\$1.14
Massachusetts	37.90%	\$0.00	\$0.09	\$0.19	\$0.28	\$0.38	\$0.47	\$0.57	\$0.66	\$0.76	\$0.85	\$0.95	\$1.04	\$1.14
California	37.40%	\$0.00	\$0.09	\$0.19	\$0.28	\$0.37	\$0.47	\$0.56	\$0.65	\$0.75	\$0.84	\$0.94	\$1.03	\$1.12
Michigan	36.50%	\$0.00	\$0.09	\$0.18	\$0.27	\$0.37	\$0.46	\$0.55	\$0.64	\$0.73	\$0.82	\$0.91	\$1.00	\$1.10
Nebraska	36.30%	\$0.00	\$0.09	\$0.18	\$0.27	\$0.36	\$0.45	\$0.54	\$0.64	\$0.73	\$0.82	\$0.91	\$1.00	\$1.09
West Virginia	36.10%	\$0.00	\$0.09	\$0.18	\$0.27	\$0.36	\$0.45	\$0.54	\$0.63	\$0.72	\$0.81	\$0.90	\$0.99	\$1.08
Virginia	34.20%	\$0.00	\$0.09	\$0.17	\$0.26	\$0.34	\$0.43	\$0.51	\$0.60	\$0.68	\$0.77	\$0.86	\$0.94	\$1.03
New Mexico	31.80%	\$0.00	\$0.08	\$0.16	\$0.24	\$0.32	\$0.40	\$0.48	\$0.56	\$0.64	\$0.72	\$0.80	\$0.87	\$0.95
Oklahoma	28.70%	\$0.00	\$0.07	\$0.14	\$0.22	\$0.29	\$0.36	\$0.43	\$0.50	\$0.57	\$0.65	\$0.72	\$0.79	\$0.86
Nevada	26.10%	\$0.00	\$0.07	\$0.13	\$0.20	\$0.26	\$0.33	\$0.39	\$0.46	\$0.52	\$0.59	\$0.65	\$0.72	\$0.78
Montana	23.90%	\$0.00	\$0.06	\$0.12	\$0.18	\$0.24	\$0.30	\$0.36	\$0.42	\$0.48	\$0.54	\$0.60	\$0.66	\$0.72
Indiana	22.90%	\$0.00	\$0.06	\$0.11	\$0.17	\$0.23	\$0.29	\$0.34	\$0.40	\$0.46	\$0.52	\$0.57	\$0.63	\$0.69
Wisconsin	22.70%	\$0.00	\$0.06	\$0.11	\$0.17	\$0.23	\$0.28	\$0.34	\$0.40	\$0.45	\$0.51	\$0.57	\$0.62	\$0.68
Connecticut	22.50%	\$0.00	\$0.06	\$0.11	\$0.17	\$0.23	\$0.28	\$0.34	\$0.39	\$0.45	\$0.51	\$0.56	\$0.62	\$0.68
Missouri	19.20%	\$0.00	\$0.05	\$0.10	\$0.14	\$0.19	\$0.24	\$0.29	\$0.34	\$0.38	\$0.43	\$0.48	\$0.53	\$0.58
Kentucky	18.20%	\$0.00	\$0.05	\$0.09	\$0.14	\$0.18	\$0.23	\$0.27	\$0.32	\$0.36	\$0.41	\$0.46	\$0.50	\$0.55
Iowa	18.00%	\$0.00	\$0.05	\$0.09	\$0.14	\$0.18	\$0.23	\$0.27	\$0.32	\$0.36	\$0.41	\$0.45	\$0.50	\$0.54
Louisiana	17.70%	\$0.00	\$0.04	\$0.09	\$0.13	\$0.18	\$0.22	\$0.27	\$0.31	\$0.35	\$0.40	\$0.44	\$0.49	\$0.53
Alabama	17.50%	\$0.00	\$0.04	\$0.09	\$0.13	\$0.18	\$0.22	\$0.26	\$0.31	\$0.35	\$0.39	\$0.44	\$0.48	\$0.53
South Dakota	15.80%	\$0.00	\$0.04	\$0.08	\$0.12	\$0.16	\$0.20	\$0.24	\$0.28	\$0.32	\$0.36	\$0.40	\$0.43	\$0.47
Utah	15.60%	\$0.00	\$0.04	\$0.08	\$0.12	\$0.16	\$0.20	\$0.23	\$0.27	\$0.31	\$0.35	\$0.39	\$0.43	\$0.47
Texas	14.70%	\$0.00	\$0.04	\$0.07	\$0.11	\$0.15	\$0.18	\$0.22	\$0.26	\$0.29	\$0.33	\$0.37	\$0.40	\$0.44
Idaho	13.70%	\$0.00	\$0.03	\$0.07	\$0.10	\$0.14	\$0.17	\$0.21	\$0.24	\$0.27	\$0.31	\$0.34	\$0.38	\$0.41
Wyoming	13.50%	\$0.00	\$0.03	\$0.07	\$0.10	\$0.14	\$0.17	\$0.20	\$0.24	\$0.27	\$0.30	\$0.34	\$0.37	\$0.41
New Hampshire	13.40%	\$0.00	\$0.03	\$0.07	\$0.10	\$0.13	\$0.17	\$0.20	\$0.23	\$0.27	\$0.30	\$0.34	\$0.37	\$0.40
Arkansas	13.00%	\$0.00	\$0.03	\$0.07	\$0.10	\$0.13	\$0.16	\$0.20	\$0.23	\$0.26	\$0.29	\$0.33	\$0.36	\$0.39
North Dakota	9.90%	\$0.00	\$0.02	\$0.05	\$0.07	\$0.10	\$0.12	\$0.15	\$0.17	\$0.20	\$0.22	\$0.25	\$0.27	\$0.30
Arizona	7.40%	\$0.00	\$0.02	\$0.04	\$0.06	\$0.07	\$0.09	\$0.11	\$0.13	\$0.15	\$0.17	\$0.19	\$0.20	\$0.22
Oregon	7.00%	\$0.00	\$0.02	\$0.04	\$0.05	\$0.07	\$0.09	\$0.11	\$0.12	\$0.14	\$0.16	\$0.18	\$0.19	\$0.21
Tennessee	6.40%	\$0.00	\$0.02	\$0.03	\$0.05	\$0.06	\$0.08	\$0.10	\$0.11	\$0.13	\$0.14	\$0.16	\$0.18	\$0.19
North Carolina	6.00%	\$0.00	\$0.02	\$0.03	\$0.05	\$0.06	\$0.08	\$0.09	\$0.11	\$0.12	\$0.14	\$0.15	\$0.17	\$0.18
Washington	6.00%	\$0.00	\$0.02	\$0.03	\$0.05	\$0.06	\$0.08	\$0.09	\$0.11	\$0.12	\$0.14	\$0.15	\$0.17	\$0.18
Colorado	4.40%	\$0.00	\$0.01	\$0.02	\$0.03	\$0.04	\$0.06	\$0.07	\$0.08	\$0.09	\$0.10	\$0.11	\$0.12	\$0.13
Mississippi	4.30%	\$0.00	\$0.01	\$0.02	\$0.03	\$0.04	\$0.05	\$0.06	\$0.08	\$0.09	\$0.10	\$0.11	\$0.12	\$0.13
South Carolina	2.50%	\$0.00	\$0.01	\$0.01	\$0.02	\$0.03	\$0.03	\$0.04	\$0.04	\$0.05	\$0.06	\$0.06	\$0.07	\$0.08
Delaware	1.70%	\$0.00	\$0.00	\$0.01	\$0.01	\$0.02	\$0.02	\$0.03	\$0.03	\$0.03	\$0.04	\$0.04	\$0.05	\$0.05
Minnesota	1.70%	\$0.00	\$0.00	\$0.01	\$0.01	\$0.02	\$0.02	\$0.03	\$0.03	\$0.03	\$0.04	\$0.04	\$0.05	\$0.05

Appendix B – Figures

Only three figures are present here : 16, 17, and 30

Figure B16: Price Comparison, Commercial Integrated Price to EIA-857 Sales Price

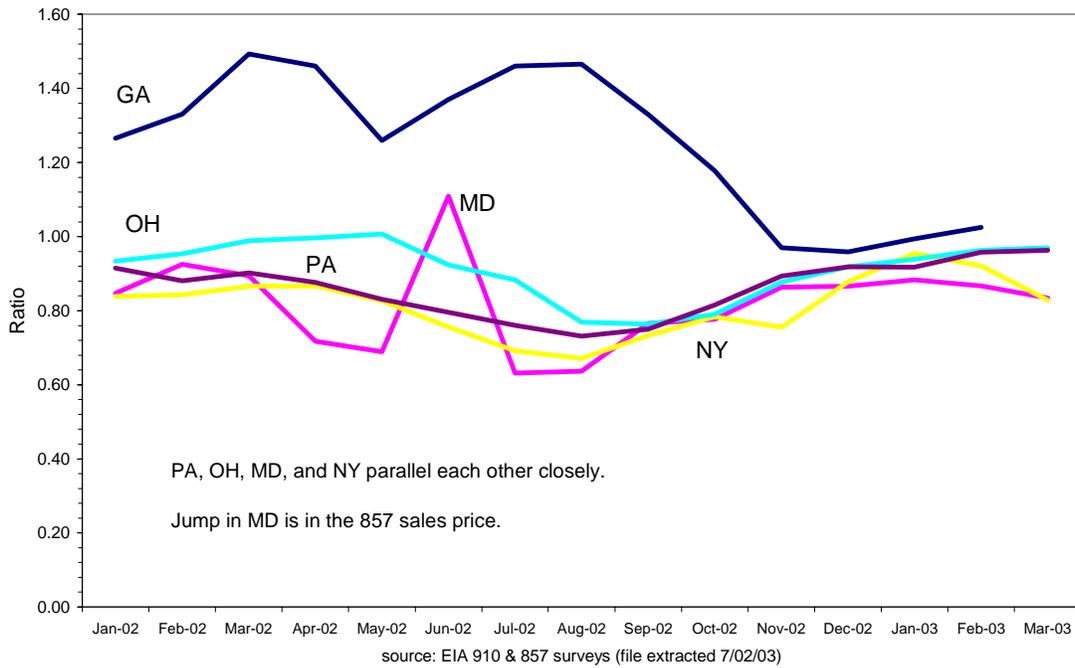
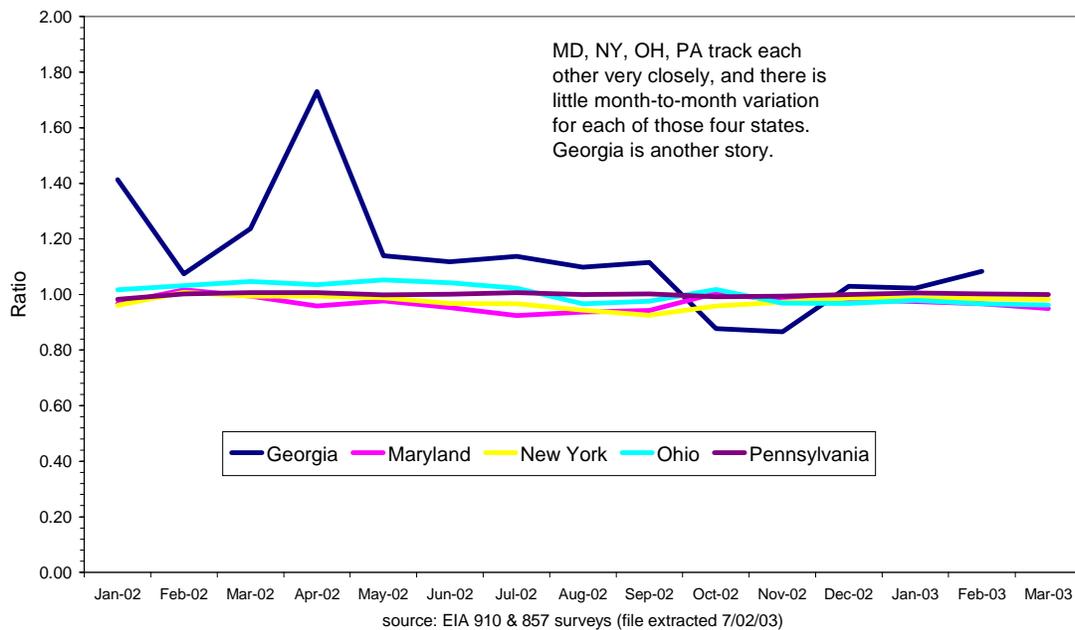
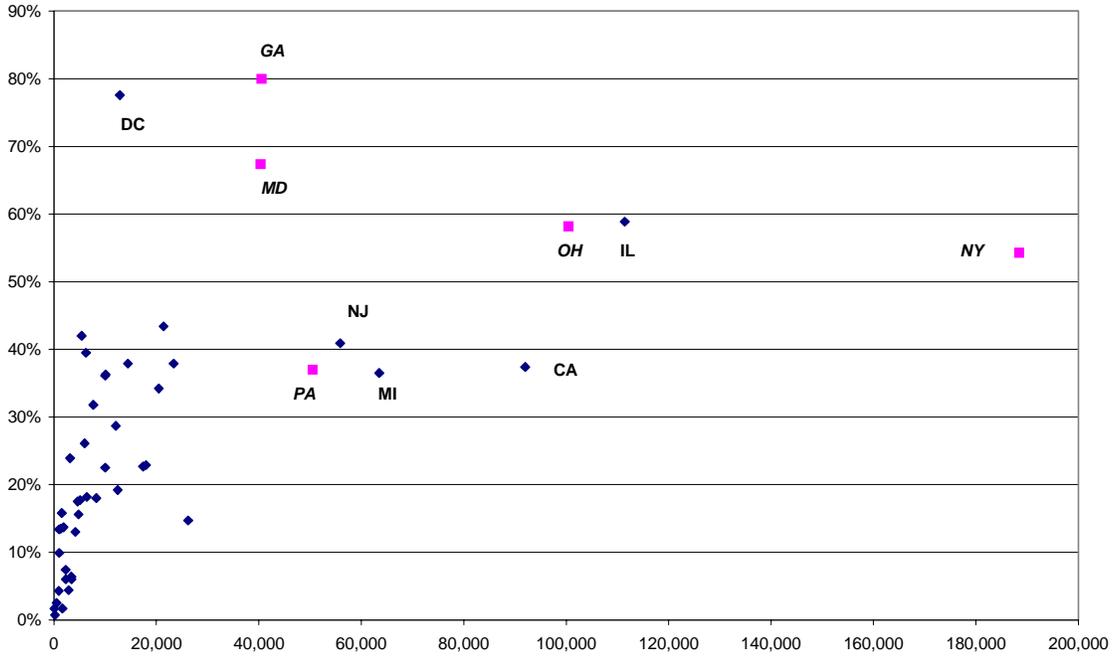


Figure B17: Price Comparisons, Residential Integrated Price to EIA-857 Sales Price



Appendix B – contd.

Figure B30: Percent of Off-System Sales vs Volume of Off-System Sales for Commercial in 2001 (mmcf) from NGA table 17



Appendix C – Formulas for Prices

This appendix presents the formulas used for computing the prices. This is similar to appendix C of the May 2003 *Natural Gas Monthly*, which includes integrated prices in Tables 21 and 22 for the 5 states covered by the EIA 910 survey.

857 Transportation Price = 857 Transportation Revenue / 857 Transportation Volume

857 Sales Price = 857 Sales Revenue / 857 Sales Volume

910 Commodity Price = 910 Sales Revenue / 910 Sales Volume

910 Distribution Charge = 910 Distribution and Taxes / 910 Volume

Marketer price for all states except Georgia :

910 Commodity Price + 857 Transportation Price

Marketer price for Georgia:

910 Commodity price + 910 Distribution charge

Percent On-System Sales = 857 Sales Volume / 857 Total Volume

Percent Off-System Sales = 1 – Percent On-System Sales

Integrated price = (Percent On-System Sales * 857 Sales Price)
+ (Percent Off-System Sales * Marketer Price)

The standard error calculation treats the 910 data as constant, and only reflects the sampling error of the 857 data. This is in keeping with usual EIA practice, and is the traditional textbook approach.
