

Introduction to Energy Statistics at U.S. Energy Information Administration



*For “International Workshop on Energy Statistics and Energy Balances”
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Topics

- Introduction to Energy Information Administration (EIA)
- EIA's statistical programs
 - Current survey operations
 - Data and information dissemination
 - Future directions
- Keys to statistical excellence

EIA as perceived by its customers

EIA's products are open to everyone who is interested in energy; key users are congressional staff and policy analysts, public citizens, journalists, energy producers and consumers, and Data Hound robots

"EIA is the gold standard for energy information."

"Thank you for the incredible, amazing job E.I.A. does in providing a uniquely reliable and timely set of crucial information on the complex and multi-layered universe of Energy."

"Well organized information with easy access."

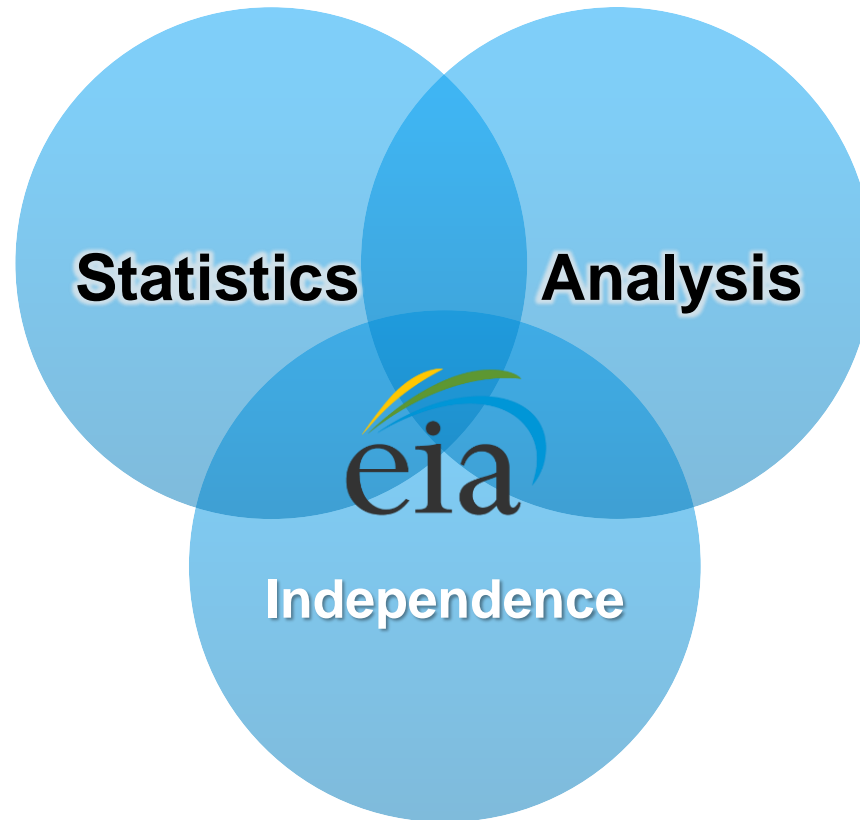
"What a handy tool! Thanks!"

"The SHOPP data (retail and wholesale heating oil and propane) data is an excellent resource."

"Thanks very much for this info! It's pretty amazing to be able to get such useful answers in such a short turnaround time. If only all our government agencies were so helpful."



Independent Statistics & Analysis
U.S. Energy Information
Administration



Greatest impact lies at the intersection of statistics, analysis, and independence.
Independence is unique and forms the basis of our credibility

Pillars for success: solid legal foundation and trust

Legal rights to collect

- * Federal Energy Administration Act of 1974 (Public Law 93-275)
- * Department of Energy (DOE) Organization Act of 1977 (Public Law 95-91)
- * Other legal mandates

Legal obligations to protect

- * Confidential Information Protection and Statistical Efficiency Act (CIPSEA), Title V of the E-Government Act of 2002 (Public Law 107-347)
- * Freedom of Information Act, 5 USC. 552, exemptions 3, 4, and 6
- * Paperwork Reduction Act, 44 U.S.C. 3501
- * Information Quality Act, P.L. No. 106-554; H.R. 5658, Section 515(a)

Trust

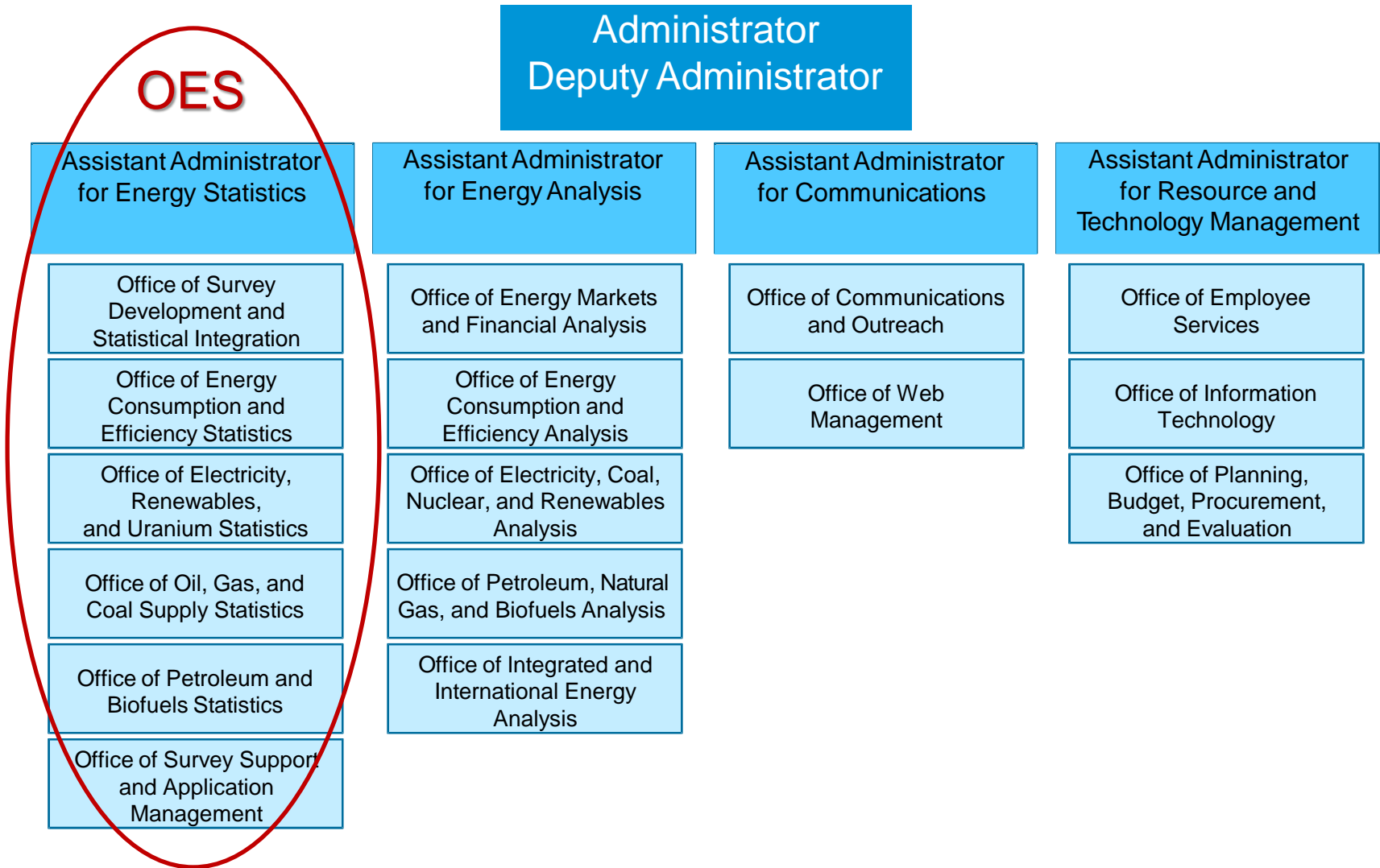
Amicable relationship with data suppliers

Maximizing public access to information while maintaining confidentiality

Integrity & transparency

- * Transparency with data users about data sources and survey methods
- * Transparency with data suppliers on use and purpose for collecting the information and how the data will be protected

EIA's organizational structure



Current surveys operated by EIA

Category Number of surveys	Hourly (real time) & daily	Weekly	Monthly	Quarterly	Annual	Quadr- ennial	Standby/ On occasion	Total *
Petroleum		10	14		4			<u>28</u>
Natural gas		1	6		3		1	<u>11</u>
Coal				1	2		2	<u>5</u>
Uranium and nuclear fuel				1	2			<u>2</u>
Alternative fuel			1		1			<u>2</u>
Renewables			1		1			<u>2</u>
Electric power	1		3	1	4			<u>7</u>
Energy consumption						3		<u>3</u>
Finance/environment /other							1	<u>1</u>
Total *	<u>1</u>	<u>11</u>	<u>23</u>	<u>3</u>	<u>15</u>	<u>3</u>	<u>4</u>	<u>57</u>

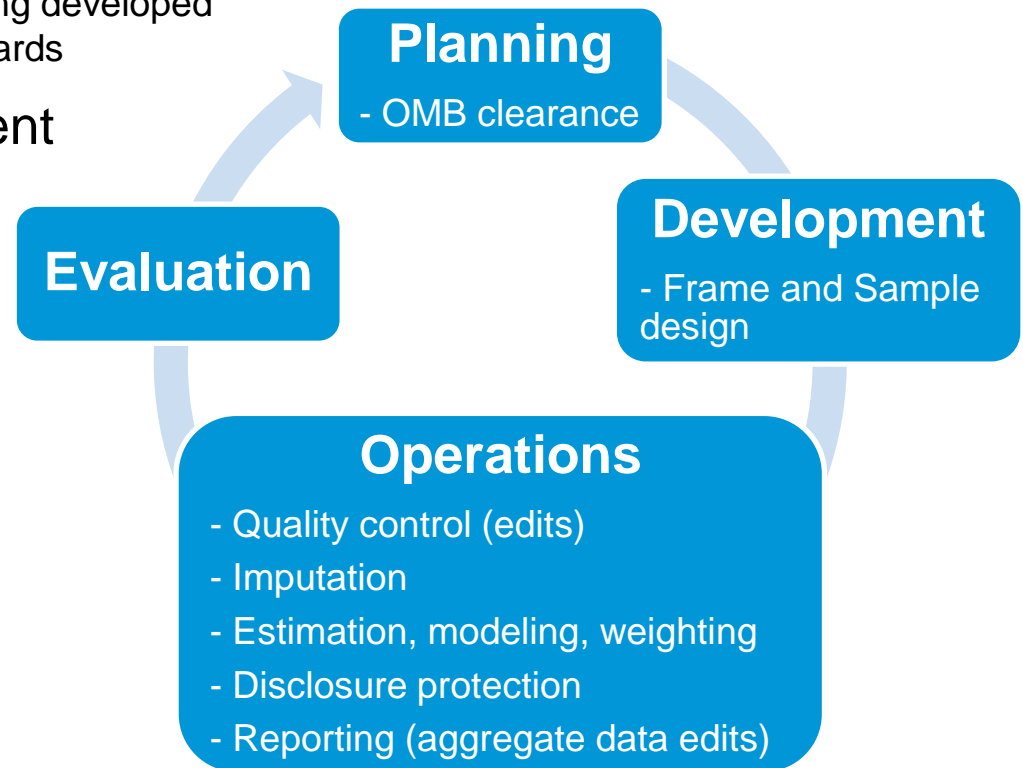
* Some surveys span multiple categories and collection frequencies; details are available at <http://www.eia.gov/survey/>

Characteristics of energy surveys

- Supply surveys - small number of companies in industry
 - Relatively easy to list and survey all companies
 - Usually dominated by large companies
- Marketing surveys - large number of companies
 - Compiling list is difficult and expensive
 - Probability- or cutoff-based samples commonly used
- Consumption surveys
 - Millions of consumers, very difficult to list
 - Sample sizes are large

General business process

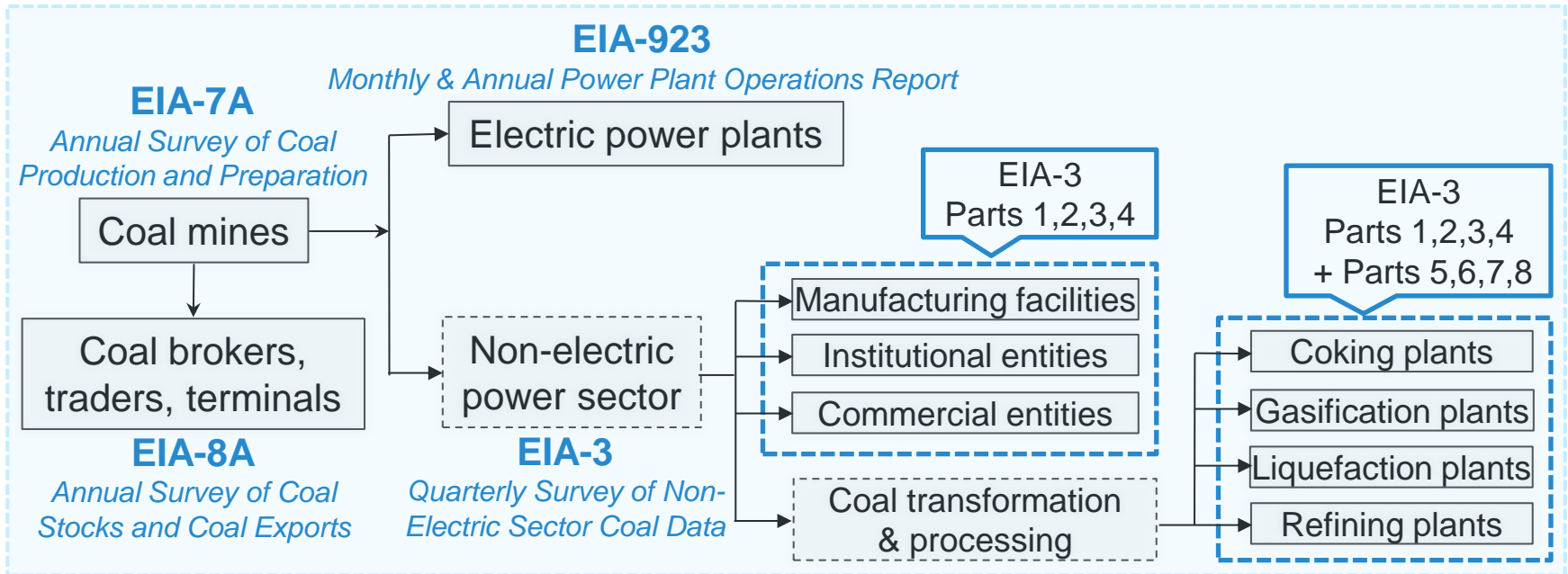
- Current EIA statistical programs were independently developed, deployed, and managed
 - The programs follow the U.S. Office of Management and Budget (OMB) [Standards and Guidelines for Statistical Surveys](#)
 - [EIA specific standards](#) are being developed to supplement the OMB standards
- Key elements of the current statistical processes:



Ensuring data and information quality

- **Objectivity** - accurate, reliable, and unbiased data and information
 - Implement standards, guidelines, and analytic techniques that are consistent with generally accepted professional standards to ensure quality throughout the entire lifecycle of data movement
 - Maintain productive contact with respondents to ensure high response
 - Edit incoming data to ensure accuracy
 - Impute data for nonresponse or when the data item fails edits
 - Use prediction models to estimate for out-of-sample units to supplement the data collected from a sample
- **Utility**
 - Conduct cognitive testing/interviews with data providers and users to evaluate information collection and dissemination methods and instruments
 - Ensure that the information is timely, relevant, accessible, and easy to use.
- **Integrity** – protect information from unauthorized access or revision
- **Influential information**
 - Transparency: provide clear and concise information on information sources, survey and analytical methods, accuracy, and reliability
 - Reproducibility

Coal data collection and dissemination



External data

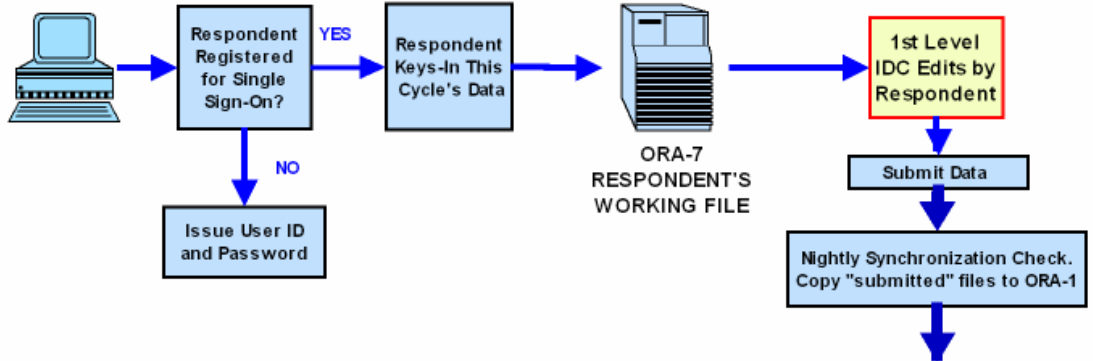
- Mine Safety and Health Administration (MSHA)
- Department of Commerce
- Association of American Railways
- American Institute of Iron and Steel
- Platts
- New York Mercantile Exchange

Coal Data Browser

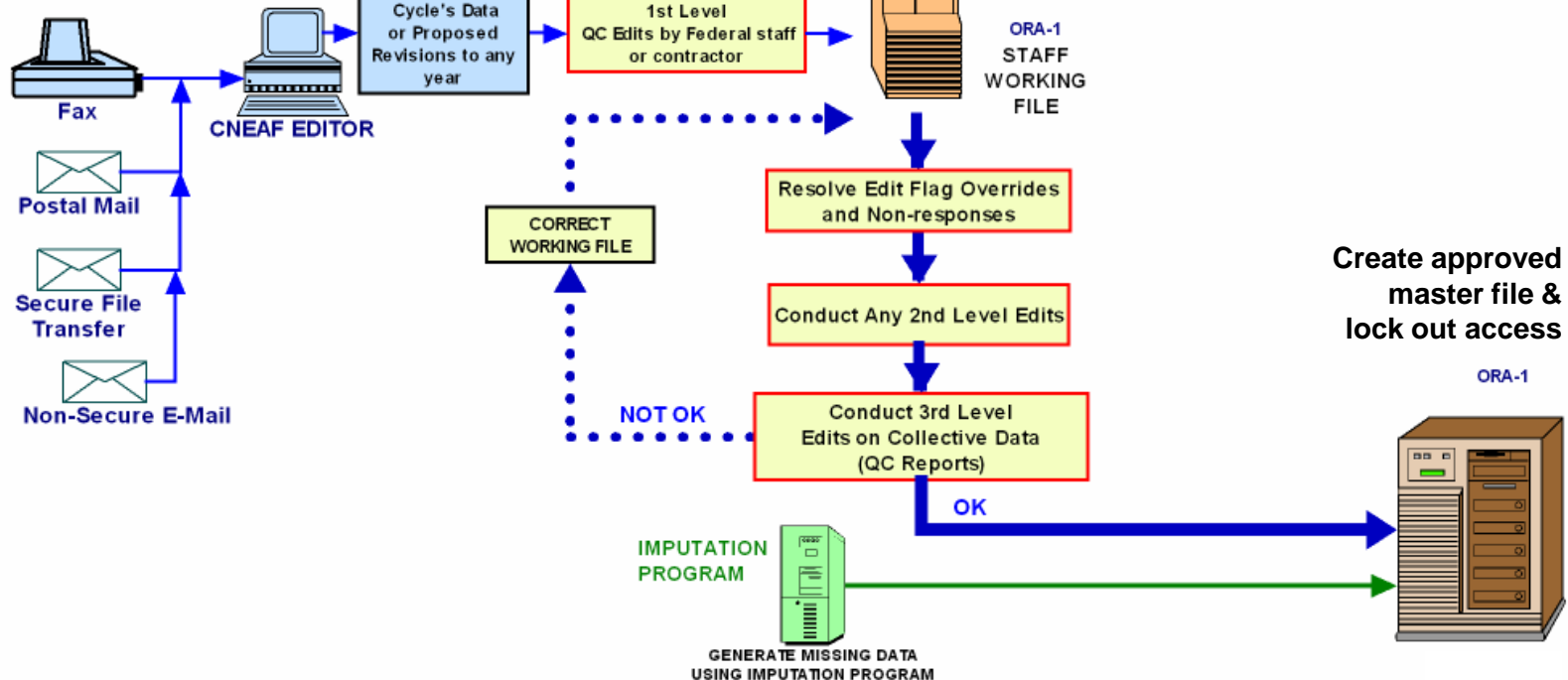
- Quarterly Coal Report
- Annual Coal Report
- Quarterly Coal Distribution Report
- Annual Coal Distribution Report
- Weekly Coal Production Report
- Weekly Coal Markets

Coal survey data flow and quality checks

IDC RESPONDENTS



NON-IDC RESPONDENTS



Coal-related survey overview

Survey	Number of respondents	Description of respondents	Key data items
EIA-7A , Annual Survey of Coal Production and Preparation	962	U.S. coal mining companies that produced 25,000+ short tons of coal, and all anthracite mines that produced 10,000+ short tons. Standalone facilities that worked 5,000+ hours during the reporting year	Coal sales, consumption, stocks, type of mine, mining method, productive capacity, and recoverable reserves
EIA-8A , Annual Survey of Coal Stocks and Coal Exports	94	Coal brokers, traders, or terminals that owned 10,000+ short tons of coal originating in the U.S. or exported coal originating in the U.S.	Stocks location state; export and stocks origin state, quantity, rank, metallurgical or not; export revenue
EIA-3 , Quarterly Survey of Non-Electric Sector Coal Data	484	All U.S. coke plants and other non-electric-sector facilities that used 1,000+ short tons of any coal for the current and prior three quarters	Parts 3-4: coal consumption, stocks, receipts, cost, origin state, mode of transportation, heat-, ash-, sulfur-, and mercury-contents Parts 5-8: production and quantity sold from coal transformation/processing plants
EIA-923 , Power Plant Operations Report (monthly, annual, supplemental)	6,459	All plants with an installed generator capacity of 1 MW connected to the grid	Electricity generation; fuel delivered, consumed, end of reporting period stocks, delivered price, and quality; emission control and cooling system information (water usage and etc.)

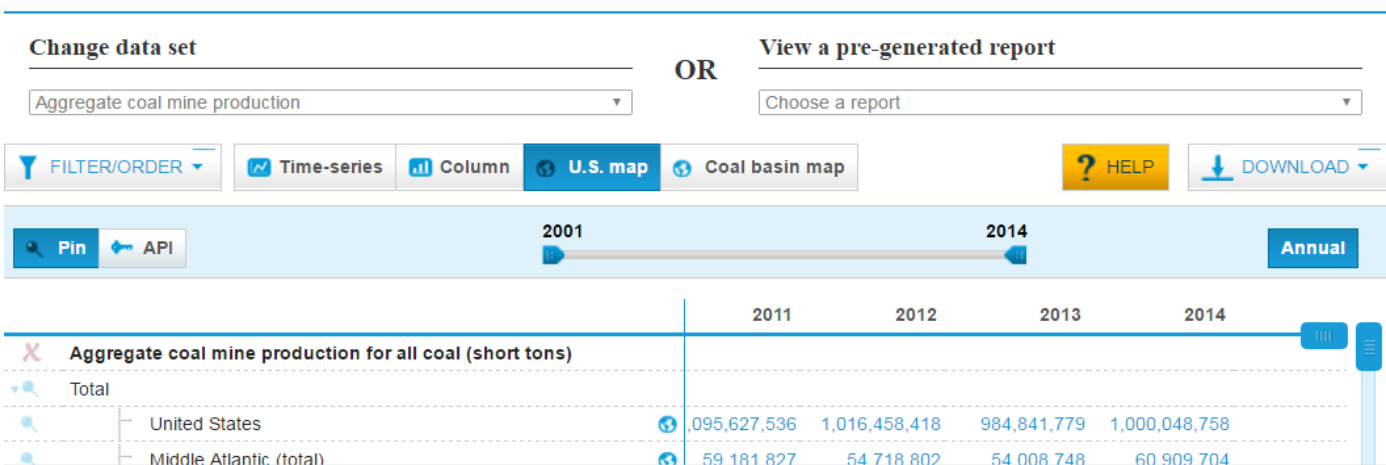
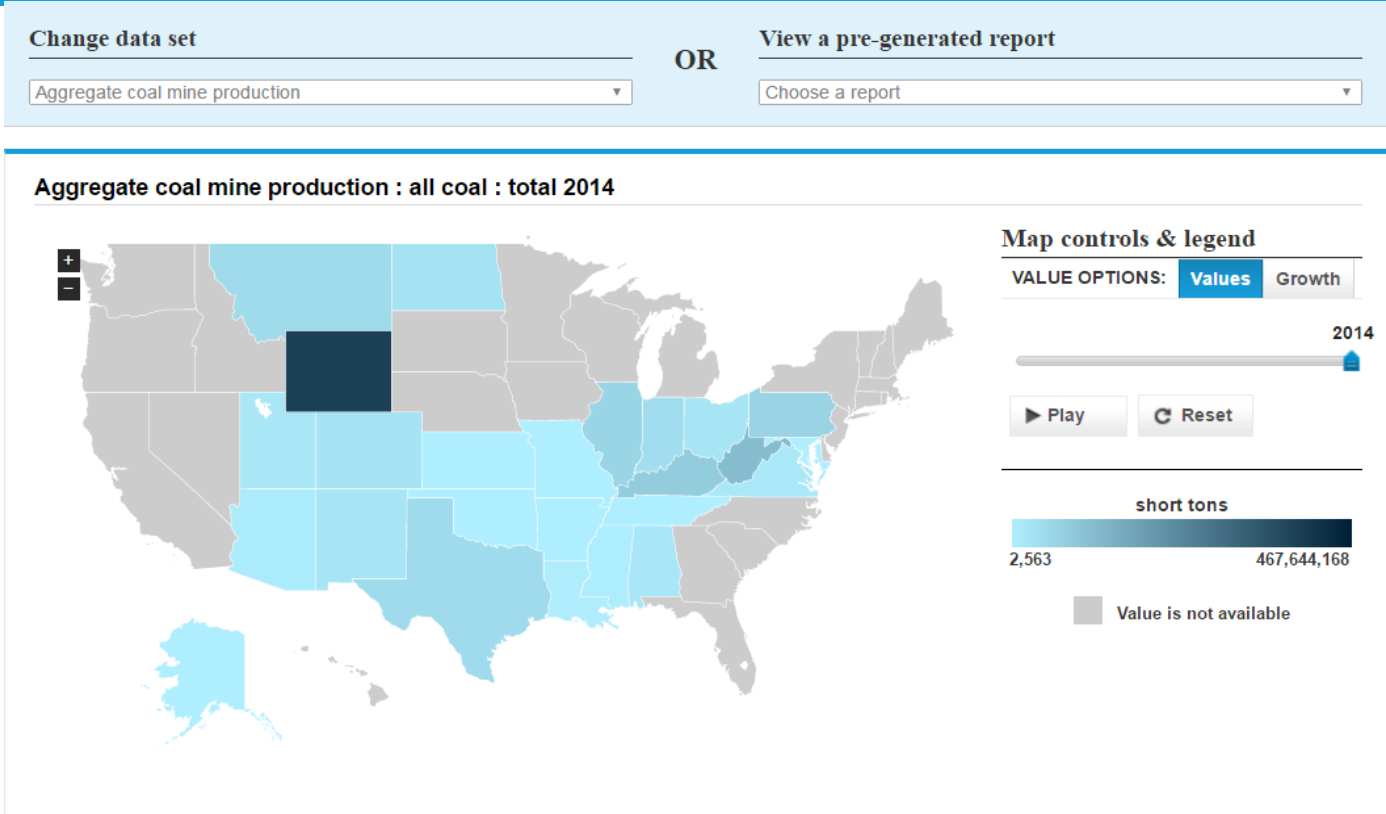
Statistical methods used in coal-related surveys

Process	Methodology	EIA form				Process	Methodology	EIA form			
		7A	8A	3	923			7A	8A	3	923
Sample design	Reporting Threshold (Census)	✓	✓	✓		Estimation, modeling, weighting					
	Cut-off				✓		Regression				✓
Quality control/ edits	Balancing items	✓		✓	✓	Disclosure protection	Cell suppression				✓
	Bands using historical data	✓	✓	✓	✓		P% rule		✓		✓
	Comparison with previous periods	✓	✓	✓	✓		(n,k) rule	✓	✓	✓	
	Comparison with other data items	✓	✓	✓	✓		Threshold rule	✓	✓	✓	
	Consistency check	✓	✓	✓	✓		Complementary	✓	✓	✓	✓
	Mean +/- number of standard deviations	✓					SAS program	✓	✓	✓	
	Outlier check				✓		Software				✓
	Regression	✓	✓	✓			Reporting/ aggregate data edits	Balancing items		✓	✓
Regression	✓	✓		✓	Comparison with previous periods				✓		
Value determined by Energy Expert	✓	✓			Comparison with other data items			✓	✓	✓	
Use external data	✓				Consistency check				✓	✓	
						SAS program			✓		

Keys to successful survey operations

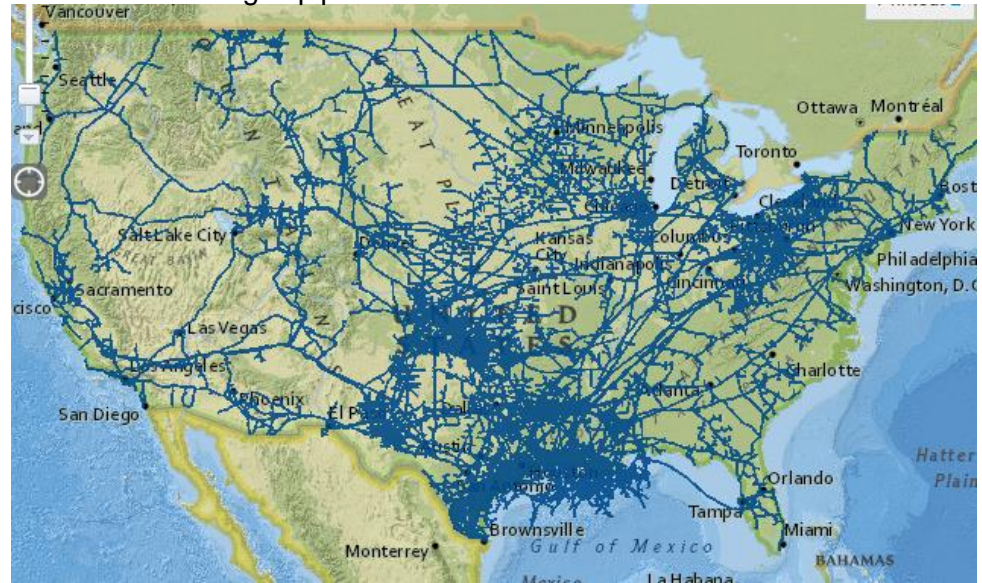
- Establish a legal framework for collecting and safeguarding the data
- Implement statistical standards, best practices, and guidelines
- Design and test survey systems that are reliable, efficient, and flexible
- Review and document the internal processes that work well
- Adopt state-of-the-art technologies
- Build relationships with data suppliers and earn their trust
- Collaborate with trade associations, other government agencies, and other stakeholders.

Data browsers

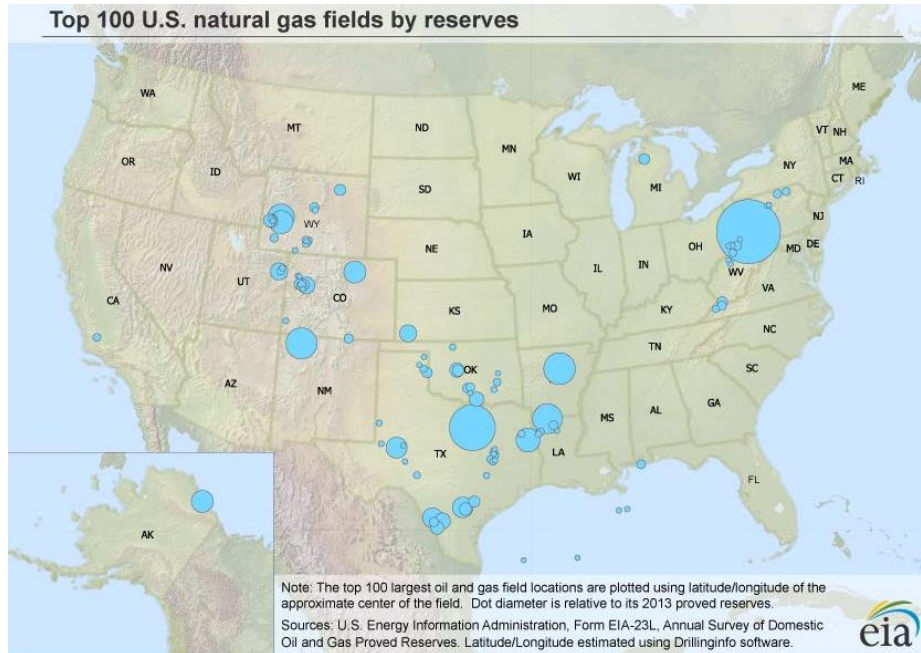


Static maps

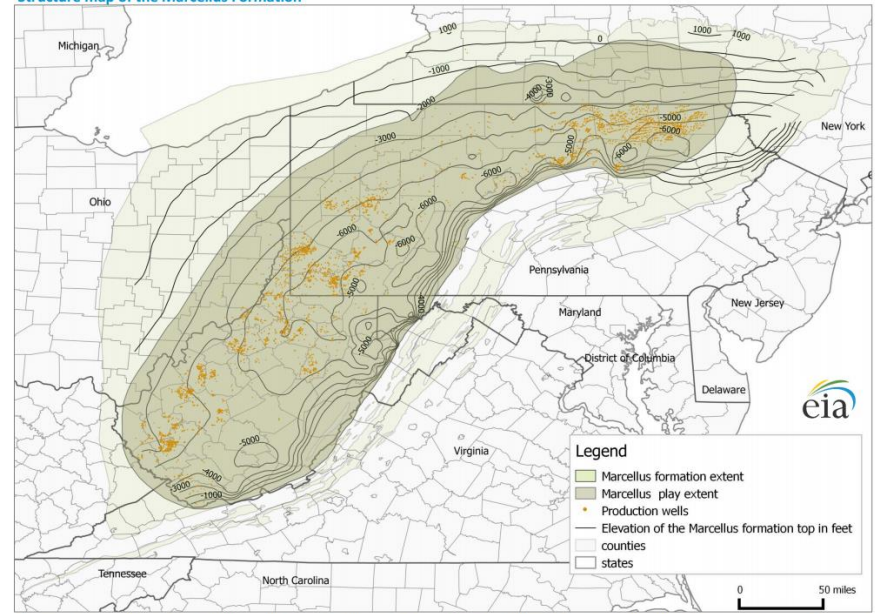
Interstate natural gas pipelines



Top 100 U.S. natural gas fields by reserves



Structure map of the Marcellus Formation



Source: U.S. Energy Information Administration, based on DrillingInfo Inc., New York State Geological Survey, Ohio State Geological Survey, Pennsylvania Bureau of Topographic & Geologic Survey, West Virginia Geological & Economic Survey, and U.S. Geological Survey.
Note: Map includes production wells from January 2009 through December 2014.

Interactive mapping system links energy infrastructure information with real-time storm information



Transformation Project

Quality Management/Metadata Management

Specify Needs	Design	Build	Collect	Process	Analyze	Disseminate	Evaluate
1.1 Identify needs	2.1 Design outputs	3.1 Build collection instrument	4.1 Create frame & select sample	5.0 Process, Impute, & Aggregate	6.1 Prepare & validate draft outputs	7.1 Prepare for distribution	8.1 Gather evaluation inputs
1.2 Consult & confirm needs	2.2 Design variable descriptions	3.2 Build/enhance process components	4.2 Set up collection		6.2 Interpret & explain outputs	7.2 Distribute & process feedback	8.2 Conduct evaluation
1.3 Establish output objectives & identify concepts	2.3 Design collections	3.3 Build/enhance dissemination components	4.3 Run collection		6.3 Apply disclosure control		8.3 Agree on action plan
1.4 Check data availability	2.4 Design frame and sample	3.4 Configure workflows			6.4 Finalize outputs		
1.5 Prepare business case	2.5 Design processing and analysis	3.5 Test production system					
	2.6 Design production systems & workflow	3.6 Test statistical business processes					
		3.7 Finalize production system					

Original GSBPM Step
 New Modified OES Step

* GSBPM: [Generic Statistical Business Process Model](#)

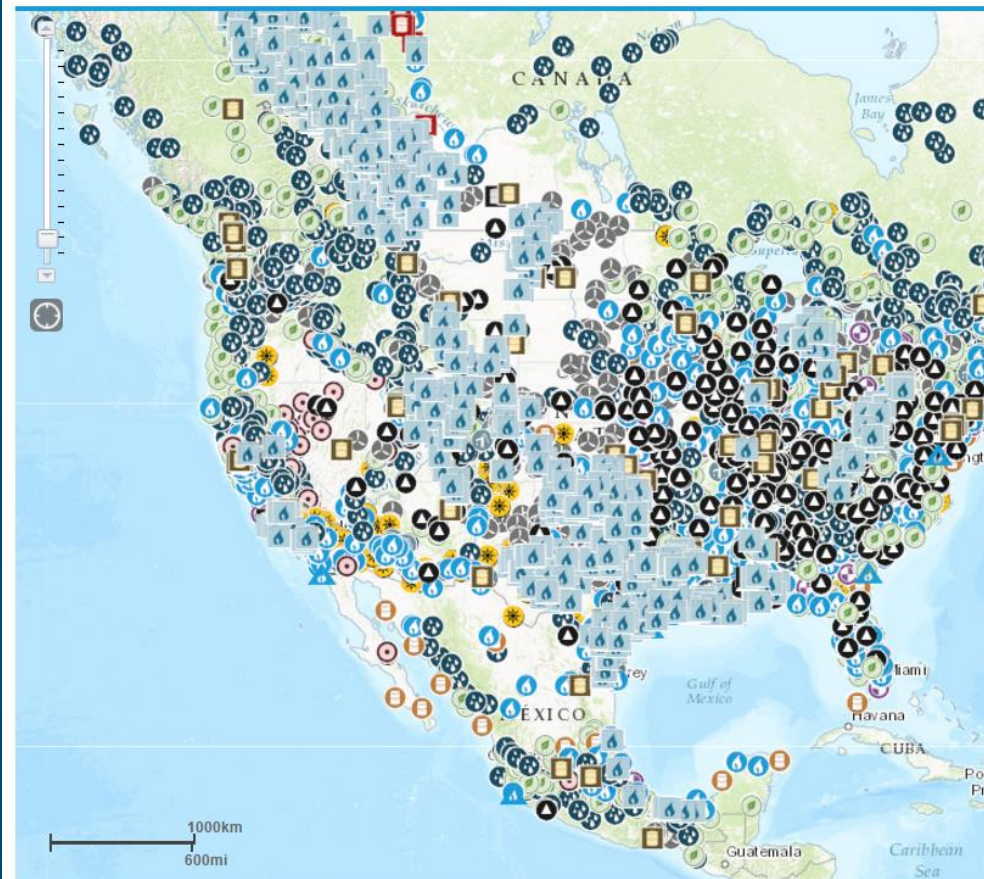
North American Cooperation on Energy Information

NORTH AMERICAN COOPERATION ON ENERGY INFORMATION (NACEI)

<http://www.nacei.org/en/>

OVERVIEW DATA ANALYSIS & PROJECTIONS

Energy Infrastructure of North America



Definitional Cross Reference

ENGLISH FRANÇAIS ESPAÑOL

ABCDEFGHIJKLMNOPQRSTUVWXYZ

Browse terms related to these categories: [crude oil and equivalents](#) [natural gas liquids \(NGL\)](#) [additives and oxygenates](#) [oil products](#) [natural gas](#) [biofuels](#) [electricity](#)

[See index of all terms](#)

A

ADDITIVES AND OXYGENATES



International Recommendations for Energy Statistics (IRES)

Additives And Oxygenates

Compounds added to or blended with oil products to modify their properties (octane, cetane, cold properties, etc.).

Remark: Examples are: (a) oxygenates such as alcohols (methanol, ethanol) and ethers [MTBE (methyl tertiary butyl ether), ETBE (ethyl tertiary butyl ether), TAME (tertiary amyl methyl ether)]; (b) esters (e.g., rapeseed or dimethylester, etc.); and (c) chemical compounds (such as TML, TEL and detergents). Some additives/oxygenates may be derived from biomass while others may be of fossil hydrocarbon origin.



International Energy Agency (IEA)

Additives And Oxygenates

Additives are non-hydrocarbon compounds added to or blended with a product to modify fuel properties (octane, cetane, cold properties, etc.).

Keys to statistical excellence

- Legal backing
- Trust
- Quality control and process efficiency
- Transparency
- Relevancy, velocity, and accessibility
- Respondent and user experience
- Agency independence
- Collaboration

Keys to statistical excellence

- Legal backing
- Trust
- Quality and efficiency of processes
- Transparency
- Product relevancy and accuracy
- User experience
- Agency independence

For more information

U.S. Energy Information Administration home page | www.eia.gov

Data Browsers | <http://www.eia.gov/beta/coal/data/browser/>

Open Data | <http://www.eia.gov/opendata/>

U.S. Energy Mapping System | <http://www.eia.gov/state/maps.cfm>

Monthly Energy Review | www.eia.gov/mer

Today in Energy | www.eia.gov/todayinenergy

State Energy Profiles | www.eia.gov/state

Drilling Productivity Report | www.eia.gov/petroleum/drilling/

Subject Matter Experts | www.eia.gov/about/contact/