Instructions for Completing Form EIA-846

General Instructions:

1. Individuals most familiar with the plant energy systems and operations, such as engineers, should complete the questionnaire especially for the end use and fuel switching sections.

2. Use the units specified on the questionnaire for reporting all quantities. See the Btu conversion factors on page 6 for a comprehensive list of various energy conversion factors. If your establishment uses more precise conversion values for your operations, use them, and indicate in the "Remarks" at the end of the form, the conversion factor(s) used.

3. Do **not** consolidate establishments. The reporting boundaries for your establishment should correspond to those used in the Economic Census - Manufacturing (EC- M). Responses to the MECS questions should be the same activities as those considered when responding to the matching EC-M.

4. Report dollar amounts rounded to the nearest dollar (e.g., report $1,257.59 as $1,258).

5. If you do not maintain book records for particular items, please use carefully prepared estimates.

6. Enter zeros in the data columns if the value is zero or none.

7. Complete all applicable sections of the questionnaire.

8. The sections of this questionnaire are designed so all questions associated with the particular energy source should be completed before going on to the next energy source. Therefore, within each section, the questionnaire should be answered from the top to the bottom of the same section, before moving on to the next section.

9. The energy sources that are preprinted on the questionnaire are considered the most frequently consumed, but they do not represent a complete list of applicable energy sources. If your establishment has energy sources that meet the criteria for reporting, but are not preprinted on the questionnaire, please specify those energy sources in the "Other Types Used as Energy" section and enter the data there.

Section–Specific Instructions:

Company Information
In this section, indicate any changes in the company name, address, or zip code.

Contact Information
Enter address and other contact information for the person most knowledgeable about completing this questionnaire, and the person whom we should contact if we have any questions concerning this filing.

Establishment Information
In this section, indicate any changes in the establishment ownership during 2022 and indicate the period covered by this filing, whether the calendar year or other period.

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Energy Sources

Reporting Criteria

An energy source should be reported on this questionnaire if:

- the energy source was consumed as a fuel, (that is, for heat, power, or electricity generation); **or**
- the energy source was consumed as a nonfuel (feedstock, raw material input); **or**
- for selected energy sources, the energy source was shipped offsite from this establishment. The energy sources for which you will be asked to supply shipments data are:
    - LPG (Butane, Ethane, Propane, Mixtures, and Other LPG/NGL)
    - Coal coke
    - Petroleum coke (Unrefined, green or calcined)
    - Breeze
    - Coke oven gas
    - Blast furnace gas
    - Acetylene
    - Hydrogen
    - Diesel or distillate fuel oil
    - Residual fuel oil
    - Naptha; and
    - Bitumen.

If your only means of an energy source during 2022 was a byproduct (or product) of an energy source used as a feedstock (or raw material input) that byproduct energy source should be reported only if it was at least partially consumed onsite as a fuel or shipped offsite. If the byproduct (or product) energy source was only itself consumed as a nonfuel (feedstock), it should be excluded.

Estimated end-use percent consumption is also collected for selected energy sources. These questions are intended to provide information on the purposes for which the energy are used in the manufacturing sector. More specific instructions for completing these parts are included in the questionnaire.

Data are collected for the following energy sources (fuels):

Electricity
Natural Gas
Diesel Fuel Oil (excluding off-site highway use)
Distillate Fuel Oil (e.g., Numbers 1, 2, 4)
Residual Fuel Oil (e.g., Numbers 5, 6, Navy Special, Bunker C)
Liquefied Petroleum Gases (LPG) and Natural Gas Liquids (NGL)

- Butane
- Ethane
- Propane
- Mixtures of Butane, Ethane, and Propane
- Other LPG and NGL which includes butylenes, ethylene, and propylene

Coal

- Anthracite
- Bituminous and Subbituminous
- Lignite

Breeze
Coal Coke
Petroleum Coke

- Marketable Petroleum Coke - Unrefined or Green
- Marketable Petroleum Coke - Calcined

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Kerosene
Motor Gasoline (excluding off-site highway use)
Naphtha and Heavier Gas Oils
Bitumen
Acetylene
Hydrogen
Wood harvested directly from trees
Byproduct Energy Source

- Blast Furnace Gas
- Coke Oven Gas
- Waste Oils and Tars (excluding Coal Tar)
- Tire-Derived Fuel (TDF)
- Waste and Byproduct Gases (e.g., flue gas, off gas, plant gas, refinery gas, still gas, vent gas)
- Pulping and Black Liquor
- Agricultural Waste (e.g., bagasse, nut shells, orchard prunings, rice hulls)
- Wood Residues and Byproducts from Mill Processing (e.g., sawdust, shaving, slabs, bark)
- Wood/Paper-related Refuse (e.g., scrap, wastepaper, wood pallets, packing materials)

Steam (excluding steam generated in an onsite boiler from CHP or other fossil fuel, wood, or combustible source)
Industrial Hot Water
Other Types Used as Energy

Energy Sources Reporting Examples

Example 1 – Your establishment depended entirely on electricity for heat and power, and no combustible energy sources were consumed. In this instance, complete the "Electricity" section. No data should be entered in any other energy source (fuel) section. Go to the "Fuel-Switching Capability" section and complete the remainder of the questionnaire.

Example 2 – Butane is used as a feedstock to produce butylenes onsite. The butylene is then used as a feedstock to produce butadiene which is shipped offsite. Report the butane used as a feedstock because it is not used as a fuel or shipped offsite. Butylene would not be reported because its only means of supply was as a byproduct and it was only used as a feedstock. Butadiene would not be reported as a shipment because it is not an identified energy source.

Fuel-Switching Capability

These questions are intended to measure the short-term capability of your establishment to use substitute energy sources in place of those actually consumed in 2022. These substitutions are limited to those that could actually have been introduced within 30 days without extensive modifications. More specific instructions for completing this section are included in the questionnaire.

Energy-Management Activities

In this section, indicate whether your establishment participated in the listed energy-management activities during 2022 and the source(s) of the financial support to implement the energy-management activity.

Technologies

Indicate any of the technologies present in this establishment. Listed technologies include general technologies which may be found in any manufacturing establishment and technologies related to cogeneration.

Establishment Size

This section asks for the number of buildings and total square footage associated with this establishment. See specific instructions in this section for the definition of what should be counted as a building.

Remarks

Please provide any explanations that may be helpful to us in understanding your reported data, including any Btu conversion factors used, if different from those provided in the enclosed table.

Conversion Factors Table

To the right are Btu conversion factors that should be used only if you do not know the actual Btu factor of the fuels consumed at your establishment site.

If your establishment uses more precise conversion values for your operations, such as the conversion factors used for the Green House Gas (GHG) Reporting Rule, use them in place of the approximations given below. However, please identify in the Remarks section (page 63), the conversion factor(s) used, if different from those listed to the right.

General Definitions:

Btu = British thermal unit(s)
One barrel = 42 gallons
One short ton = 2,000 pounds

Examples of conversion from physical quantities to Btu include:

- Your establishment consumed 250 cubic feet of hydrogen in 2022.

The Btu equivalent is:
(250 cubic feet) x (323.6 Btu/cubic foot)

= 80,900 Btu
= 0.0809 million Btu

- Your establishment consumed 300 pounds of hydrogen in 2022.

The Btu equivalent is:
(300 pounds) x (253,395 Btu/pound)

= 76,018,500 Btu
= 76.019 million Btu

Energy Source	Conversion Factor(s)
Acetylene	21,600 Btu/pound 1,500 Btu/cubic feet
Bagasse	4,081 Btu/pound
Biomass	5,300 Btu/pound
Breeze	19.8 million Btu/short ton
Butane	4.353 million Btu/barrel 0.1036 million Btu/gallon
Coal	20.578 million Btu/short ton
Coal (**use for coke plants only**)	28.666 million Btu/short ton
Coal Coke	24.8 million Btu/short ton
Distillate Fuel Oil	5.770 million Btu/barrel
Electricity	3,412 Btu/kilowatthour
Ethane	2.783 million Btu/barrel 0.06626 million Btu/gallon
Hydrogen	253,395 Btu/pound 323.6 Btu/cubic feet 149,690 Btu/gallon
Industrial Hot Water	140 Btu/pound 7.84 pounds/gallon
Isobutane	4.183 million Btu/barrel 0.09960 million Btu/gallon
Liquefied Petroleum Gas (LPG)	3.369 million Btu/barrel 0.08021 million Btu/gallon 4.5 pounds/gallon
Natural Gas	1.039 million Btu/1,000 cubic feet 10.39 therms/1,000 cubic feet
Petroleum Coke	6.135 million Btu/barrel 30.675 million Btu/short ton 5 barrels/short ton
Propane	3.841 million Btu/barrel 0.09145 million Btu/gallon
Pulping and/or Black Liquor	11 million Btu/short ton
Residual Fuel Oil	6.287 million Btu/barrel
Roundwood	21.5 million Btu/cord 17.2 million Btu/short ton 0.014 million Btu/board foot
Sawdust (7% moisture)	8,000 Btu/pound
Steam	1,200 Btu/pound
Still, Refinery, and/or Waste Gas	6.287 million Btu/barrel 1,039 Btu/cubic feet
Waste Materials (Wastepaper)	7,500 Btu/pound
Waste Oils and Tars	6 million Btu/barrel
(Green) Wood Chips (50% moisture)	10 million Btu/short ton
Wood Waste (50% moisture)	9 million Btu/short ton