

Electric Power Thermal Generating Station Fuel Consumption Annual Survey 2009 (Industrial Generation)

This guide is designed to assist you as you complete
the 2009 Electric Power Thermal Generating Station Fuel Consumption Annual Survey.
Help Line: (613) 951-3087

Your answers are confidential.

Statistics Canada is prohibited by law from releasing any information from this survey which would identify a person, business, or organization, without their permission or without due legal authority. The confidentiality provisions of the *Statistics Act* are not affected by either the *Access to Information Act* or any other legislation. Therefore, for example, the Canada Revenue Agency cannot access identifiable survey data from Statistics Canada.

These survey data will only be used for statistical purposes and will be published in an aggregate form only.

Table of contents

- A – General information: Purpose of survey, Data-sharing agreements and Data linkage
- B – Reporting Instructions
- C – Definitions
- D – Solid fuels used to generate electricity
- E – Liquid fuels used to generate electricity
- F – Gaseous fuels used to generate electricity
- G – Other fuels used to generate electricity
- H – Units of measure
- I – Reporting categories

A – General information

Purpose of Survey

The purpose of this survey is to obtain information on the supply of, and demand for, energy in Canada. This information serves as an important indicator of Canadian economic performance, and is used by all levels of government in establishing informed policies in the energy area. In the case of public utilities, it is used by governmental agencies to fulfill their regulatory responsibilities. The private sector also uses this information in the corporate decision-making process.

Data Sharing Agreements

To reduce respondent burden, Statistics Canada has entered into data sharing agreements with provincial and territorial statistical agencies and other government organizations, which must keep the data confidential and use them only for statistical purposes. Statistics Canada will only share data from this survey with those organizations that have demonstrated a requirement to use the data.

Section 11 of the *Statistics Act* provides for the sharing of information with provincial and territorial statistical agencies that meet certain conditions. These agencies must have the legislative authority to collect the same information, on a mandatory basis, and the legislation must provide substantially the same provisions for confidentiality and penalties for disclosure of confidential information as the *Statistics Act*. Because these agencies have the legal authority to compel businesses to provide the same information, consent is not requested and businesses may not object to the sharing of the data.

For this survey, there are **Section 11** agreements with the provincial and territorial statistical agencies of Newfoundland and Labrador, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, British Columbia, and Yukon.

The shared data will be limited to information pertaining to business establishments located within the jurisdiction of the respective province or territory.

Section 12 of the *Statistics Act* provides for the sharing of information with federal, provincial or territorial government organizations. Under **Section 12**, you may refuse to share your information with any of these organization by writing a letter of objection to the Chief Statistician and returning it with the completed questionnaire. Please specify the organizations with which you do not want to share your data.

For this survey, there are **Section 12** agreements with the statistical agencies of Prince Edward Island, the Northwest Territories, Nunavut, and with Natural Resources Canada, Environment Canada, and the British Columbia Ministry of Energy, Mines and Petroleum Resources.

For agreements with provincial and territorial government organizations, the shared data will be limited to information pertaining to business establishments located within the jurisdiction of the respective province or territory.

Data Linkage

To enhance the data from this survey, Statistics Canada may combine it with information from other surveys or from administrative sources.

B – Reporting Instructions

This schedule is to be completed for the station or stations indicated on the affixed label to the questionnaire. Please report for the requested period: January to December 2009.

Report only the amount of fuel used for the generation of electricity.

Reported value (\$) should be the total cost at the station service load.

Estimate if necessary.

If there are any stations on standby, please report them in the notes section.

If the reported fuels are consumed for electricity generation ONLY, please complete part 2 (*except the efficiency column*).

If the reported fuels are consumed for electricity generation and towards other purposes, please complete part 1 & 2. (*Report the total amount of fuel(s) used in the boiler*).

Should you require assistance (or additional questionnaires); please contact the telephone number indicated on the front page of your questionnaire.

C – Definitions

PART 1

Electrical Generator Efficiency: The efficiency of an entity (a device, component or system) defined as useful power output divided by the total electrical power consumed.

Portion of Steam used to Produce Electricity: In the process of generating electricity, utilities may use steam completely towards the production of electricity, however an industry may use the steam for other purposes in their manufacturing and generate electricity as a side product.

Actual turbine efficiency: The engine efficiency is the ratio of the real output of the turbine to the ideal output (ability to convert energy from one to the other).

Cogeneration : A highly efficient means of generating heat and electric power at the same time from the same energy source. Cogeneration makes use of the excess heat, usually in the form of relatively low-temperature steam exhausted from the power generation turbines towards another purpose.

Type : Primary Purpose

Electricity Internal: electricity which is used only for internal purposes.

Electricity External: electricity which is sold / supplied to another company.

Industry Internal: Fuels and processes used towards internal purposes that do not contribute towards the generation of electricity. (i.e. steam for drying paper)

Industry External: Fuels and processes used towards the generation of electricity.

Sub-Types

Combined Cycle: burns fuel in a gas turbine or engine to generate electricity. The exhaust from the turbine or engine can provide usable heat or go to a heat recovery system to generate steam which then may drive a secondary steam turbine.

Steam Turbine: burns fuel to produce steam, which generates power through a steam turbine. Exhaust (left over steam) can be used as low-pressure steam to heat water.

Combustion engine diesel: rely solely on heat and pressure created by the engine in its compression process for ignition. The compression that occurs is usually twice or more higher than a gasoline engine. Diesel engines will take in air only, and shortly before peak compression, a small quantity of diesel fuel is sprayed into the cylinder via a fuel injector that allows the fuel to instantly ignite.

Natural Gas Combustion Turbine: involves a natural gas fired turbine, which runs a generator to produce electricity. The exhaust gas flows through a heat recovery boiler, which can convert the exhaust energy into steam or usable heat.

Other, specify: Please indicate any sub-type not identified above.

PART 2

D – Solid Fuel types used to generate electricity

Any energy form consumed not otherwise identified on the questionnaire. Specify in the spaces provided.

Bituminous Coal : A dense, black coal, often with well-defined bands of bright and dull material with a moisture content usually less than 20%. Used primarily for generating electricity, making coke and space heating.

Sub-bituminous coal : A black coal used primarily for thermal generation, with moisture content between 15% and 30%. (Canadian/Foreign) - It is important to distinguish between Canadian versus imported sub-bituminous as each carries a different content, depending on the location of the coal mine.

Lignite : A brownish-black coal of low rank containing 30% to 40% moisture and volatile matter. Used almost exclusively for electric power generation.

Wood (Report for “Dry” method) : Wood and wood energy used as fuel, including round wood (cord wood), lignin, wood scraps from furniture and window frame manufacturing, wood chips, bark, sawdust, forest residues, charcoal and pulp waste.

Petroleum coke : (often abbreviated petcoke) is a carbonaceous solid derived from oil refinery coker units or other cracking processes. Other coke has traditionally been derived from coal.

Agriculture biomass : includes animal manure, cellulosic crop residue, fruit and vegetable culls and food-processing effluent. Potential energy crops include high-yielding, high-carbohydrate crops such as switchgrass and vegetable-oil crops such as canola and sunflower, and hydrocarbon plants such as milkweed and gumweed.

Other biomass : (food processing) can include residues that are produced during the processing of a product, such as cheese whey, canning factory residues, fruit pits, apple pomace, coffee grounds.

Other biomass : (type unknown) any other type of biomass not otherwise identified on the questionnaire. Specify in the spaces provided.

Municipal and other waste : can include residues that are produced during the processing of a product, such as paper, cardboard, rubber, leather, natural textiles, wood, brush, grass clippings, kitchen wastes and sewage sludge.

E – Liquid Fuel types used to generate electricity

Any energy form consumed not otherwise identified on the questionnaire. Specify in the spaces provided.

Biodiesel : refers to a non-petroleum-based diesel fuel consisting of short chain alkyl (methyl or ethyl) esters, made by transesterification of vegetable oil or animal fat (tallow), which can be used (alone, or blended with conventional petrodiesel) in unmodified diesel-engine vehicles.

Ethanol : (ethanol fuel) the same type of alcohol found in alcoholic beverages. It can be used as a fuel, mainly as a biofuel alternative to gasoline. It can be made from very common crops such as sugar cane and corn, it is an increasingly common alternative to gasoline in some parts of the world.

Other Biofuel : any other type of biofuel not otherwise identified on the questionnaire. Specify in the spaces provided.

Light fuel oil (LFO) : all distillate type fuels for power burners, fuel oil no.1, fuel oil no.2 (heating oil no.2), fuel oil no.3 (heating oil no.3), furnace fuel oil, gas oils and light industrial fuel.

Heavy fuel oil (HFO) : all grades of residual type fuels including low sulphur. Usually used for steam and electric power generation and diesel motors. Includes fuel oil nos. 4, 5 and 6. (Canadian/Foreign) – it is important to distinguish between Canadian versus imported Heavy Fuel Oil as each carries a different energy content, and is used to validate the integrity of Canada's Energy Balances.

Propane : is a three-carbon alkane, normally a gas, but compressible to a transportable liquid. It is derived from other petroleum products during oil or natural gas processing. It is commonly used as a fuel for engines, barbecues and home heating systems.

Diesel : all grades of distillate fuel used for diesel engines including low sulphur content (lower than 0.05%). Does not include diesel used for transportation off the plant site.

Spent pulping liquor : A by-product in the paper making process, containing carbohydrate and lignin decomposition products. Also known as black liquor.

Orimulsion : is a registered trademark name for a bitumen-based fuel that was developed for industrial use. Bitumen is a mixture of organic liquids that are highly viscous, black, sticky, entirely soluble in carbon disulfide and composed primarily of highly condensed polycyclic aromatic hydrocarbons. Currently orimulsion is used as a commercial boiler fuel in power plants worldwide.

F – Gaseous Fuel types used to generate electricity

Any energy form consumed not otherwise identified on the questionnaire. Specify in the spaces provided.

Waste gasification : the process of waste gasification involves converting the organic material within the waste into synthetic natural gas (syngas), which is a mixture of carbon monoxide and hydrogen gas. The syngas is used to produce electricity in the same way that natural gas is combusted for energy production-in combined-cycle mode.

Gasification : uses high temperatures in the presence of oxygen to convert solid biomass into gas (known as producer gas) to fuel a turbine to generate electricity.

Natural Gas : a mixture of hydrocarbons (principally methane) and small quantities of various hydrocarbons existing in the gaseous phase or in solution with crude oil in underground reservoirs.

Coke oven gas : is obtained as a by-product of the manufacture of coke oven coke for the production of iron and steel.

Methane : is a chemical compound with the molecular formula CH₄. It is the simplest alkane, and the principal component of natural gas. Burning methane in the presence of oxygen produces carbon dioxide and water.

Refinery fuel gas : a gaseous mixture of methane, light hydrocarbons, hydrogen, and other miscellaneous species (nitrogen, carbon dioxide, hydrogen sulphide, etc) that is produced in the refining of crude oil and/or petrochemical processes and that is separated for use as a fuel in boilers and process heaters throughout the refinery.

G – Other Fuel types used to generate electricity

Nuclear : is any nuclear technology designed to extract usable energy from atomic nuclei via controlled nuclear reactions. The most common method today is through nuclear fission, though other methods include nuclear fusion and radioactive decay.

Steam from waste heat : The amount of electricity generated when waste heat is recaptured to run a steam generator.

H – Units of Measure

Kilojoules per kilograms	(kj/kg)
Kilojoules per litres	(kj/l)
Kilojoules per cubic meter.	(kj/m³)
Metric tonnes	(t)
Kilolitres	(kl)
Thousands of cubic metres.	(10³m³)
Kilograms	(kg)
Canadian dollars.	(\$)
Megawatts per hour	(MW.h)

I – Reporting Categories

Average heat content

The energy content one can expect to obtain from burning various raw materials.

Quantity

Please indicate the amount or volume of fuel used to generate electricity.

Total Cost

Please indicate the fuel cost in Canadian dollars.

Generation

Shaded grey area is reserved for Statistics Canada use only.

Please complete the total combined electricity generation in the "Net MW.h" box, line (5.0).

Electricity Generation

Indicate the total (combined) amount of electricity generated by all fuel types used.

Note : If your company is reporting for more than one generator (steam, combustion turbine, etc), please indicate separately the electricity generated by generator type on a separate questionnaire.

Thank you for your participation.