

Consolidated Energy Statistics Table: User Guide

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1 Introduction

High quality, timely data is the basis for informed discussion and decision-making by all levels of government, as well as by industry, academia, and the public.

The Consolidated Energy Statistics table (CEST) provides national level monthly estimates of supply and demand characteristics, for both primary and secondary energy sources by fuel type. The data is presented in terajoules; a common unit of measure, allowing easy comparisons between different fuel and energy types. The table is updated with new data on a monthly basis.

2 Definitions

2.1 Supply and Demand variables

Production – Production is the capture, extraction or manufacture of fuels or energy in forms that are ready for general use.

Exports – Exports comprise fuel and other energy products leaving Canada.

Imports – Imports comprise fuel and other energy products entering Canada.

Stock variation – Stock variation is the increase or decrease in stocks over a given month and calculated as ending stocks minus beginning stocks. Also known as inventory variation, inventory change, and stock change.

- **Stock** – Stock is the quantities of energy products that are held in storage in Canada. Also known as inventory.
- **Ending stock** – Ending stock is the quantities of energy products that are held in storage in Canada on the last day of the month (end of day).
- **Beginning stock** – Beginning stock is the quantities of energy products that are held in storage in Canada on the first day of the month (start of day).

Inter-product transfers – Inter-product transfers is the transfer of products between different production forms. Examples: The re-classification of propane, butane, and ethane from refined petroleum products to natural gas liquids.

Other adjustments – Other adjustments is a variable used to adjust availability and net supply so they balance. Adjustments may reflect imperfections in the reported data, incoherence between data sources, and losses in transportation or transmission.

Availability – Availability is the amount of product available for use. $\text{Availability} = \text{production} + \text{imports} + \text{inter-product transfers} + \text{other adjustments} - \text{exports} - \text{stock variation}$.

Transformed to electricity – Transformed to electricity is the amount of fuel used by fuel type to generate secondary electricity and may include some fuels used for co-generation. Adequate data is not available to enable a detailed breakout of the fuels used in co-generation.

Transformed to coke – Transformed to coke is the amount of coal used to produce coke.

Transformed to refined petroleum products – Transformed to refined petroleum products is the amount of crude oil used as a feedstock to produce refined petroleum products. It includes products that have been blended with refined petroleum products, such as renewable fuels and natural gas liquids. Example: butane added to motor gasoline.

Net supply – Net supply is the amount of product available for use after the amounts used in transformation processes are subtracted. $\text{Net supply} = \text{availability} - (\text{transformed to electricity} + \text{transformed to coke} + \text{transformed to refined petroleum products})$.

2.2 Products

Coal – Coal is a black or brownish rock that is formed from plant remains that have been compacted, hardened, chemically altered and metamorphosed by heat and pressure over time. Coal is a primary energy product.

Coke – Coke is a gray, hard, and porous carbonaceous residue derived from baking coal in an oven at high temperatures. Coke is a secondary energy product.

Crude oil – Crude oil is typically a mixture of hydrocarbons that exists in liquid phase in natural underground reservoirs and remains liquid at atmospheric pressure after passing through surface separating facilities. Also includes bitumen which is highly viscous. There are several types of crude oil which are described below. Crude oil is a primary energy product.

- **Conventional oil and gas extraction** – A mixture of mainly pentanes and heavier hydrocarbons that is recovered or is recoverable at a gas well from an underground reservoir and that is liquid at the conditions under which its volume is measured. Includes light, medium and heavy crude oil.
- **Crude bitumen** – A naturally occurring viscous mixture, mainly composed of hydrocarbons heavier than pentane.
- **Synthetic crude** – A mixture of mainly pentanes and heavier hydrocarbons that is derived from crude bitumen and that is liquid at 15°C.
- **Pentanes plus** – A mixture mainly of pentanes and heavier hydrocarbons that ordinarily may contain some butanes and which is obtained from processing of raw gas, condensate or crude oil.
- **Condensate** – A mixture of mainly pentanes and heavier hydrocarbons that is recovered or is recoverable at a gas well from an underground reservoir and that may be gaseous in its virgin reservoir state, but is liquid at 15°C and 101.325 kPa.

Electricity – Electricity is the transfer of energy through physical phenomena involving electric charges and their effects when at rest and in motion. Electricity can be generated through different processes, such as the conversion of energy contained in falling water or by the combustion of fuels. Electricity generated can either be primary or secondary, depending on the type of generation. Secondary electricity represents the amount of electricity generated from thermal generation.

Natural gas – Natural gas is a mixture of gaseous hydrocarbons, primarily methane. Natural gas is a primary energy product.

Natural gas liquids (NGLs) – Natural gas liquids are a mixture of ethane, propane, butane (normal and iso-butane), and higher alkanes.

Primary energy – Primary energy is produced by the capture or extraction of fuels or energy from natural energy flows, the biosphere and natural reserves of fossil fuel.

Refined petroleum products – Refined petroleum products obtained from the processing of crude oil and other hydrocarbon compounds. Refined petroleum products are a secondary energy product.

Renewable fuels – Renewable fuels are fuel blending components produced from renewable sources such as biomass. Renewable fuels are a primary energy product.

Secondary energy – Secondary energy is the manufacturing of energy products through the transformation of other fuels or energy, whether primary or secondary.

3 Consolidated Energy Statistics Table Explanatory Notes

The data contained in the Consolidated Energy Statistics Table (CEST) are derived primarily from Statistics Canada's monthly energy surveys and administrative records. CEST data are updated and revised as revisions are made to the source data. Most of the data feeding the CEST are provided in volumetric or mass units. As a result, these data must be converted to energy units. This conversion is done using the heating values of the different types of fuels which can be found in Appendix A.

The Report on Energy Supply and Demand (RES-D) ([25-10-0029-01](#)) also provides estimates on energy supply and demand characteristics, but on an annual provincial basis. As a result of concept and methodology differences, annualizing CEST will not match the RES-D estimates.

Coal

The data presented in the table are a summation of different types of coal, including anthracite, bituminous, sub-bituminous, and lignite.

Coal production and coal mine and port stock data are collected through the Monthly Coal Supply and Disposition Survey (survey number [2147](#)). Stock data is a combination of coal stock being held at coal mines, ports, and coke plants.

Imports and exports are based on customs trade data, which are derived from the administrative records of the Canadian Border Agency and the United States Customs Border Protection.

The volumes of coal transformed to coke and coke plant stock of coal are collected through the Monthly Coke Supply and Disposition Survey (survey number [2003](#)).

The volume of coal transformed to electricity is calculated based on the quantity of electricity produced using coal as collected by Monthly Electricity Supply and Disposition Survey (survey number 2151) and an efficiency ratio collected through the Annual Survey of Electric Power Thermal Generating Station Fuel Consumption Survey (survey number [2196](#)).

Net supply in the CEST is adjusted to equal the sum of the volume of coal consumed by coal mines and the volume sold to end-users except those volumes used by end-users to manufacture coke or for electricity generation. This adjustment is carried out using the “other adjustments” variable.

Coke

The input of coal at coke plants is shown in the table under coal as “Transformed to coke”.

All coal data, with the exception of imports and exports, is collected through the Monthly Coke Supply and Disposition Survey (survey number [2003](#)).

Imports and exports are based on customs trade data, which are derived from the administrative records of the Canadian Border Agency and the United States Customs Border Protection.

Crude oil

The data presented in the table are a summation of different types of crude oil and equivalent products, including conventional crude oil, crude bitumen, synthetic crude, pentanes plus, and condensate.

Crude oil data is collected by the Monthly Crude Oil and Natural Gas Program (survey number [2198](#)), which amalgamates crude oil data using a variety of administrative data sources and surveys.

Net supply in the CEST is adjusted to zero using the “other adjustments” variable. As there is not a stand-alone end use for crude oil, it is assumed that net supply should equal zero.

Natural gas

Marketable production refers to the volume of natural gas received by natural gas transmission lines. Natural gas production, as defined by this table, is the quantity of marketable natural gas produced plus the quantity consumed by the producers of natural gas.

Natural gas data (except for natural gas transformed to electricity) is collected by the Monthly Crude Oil and Natural Gas Program (survey number [2198](#)).

The volume of natural gas transformed to electricity is a calculated volume based on the quantity of electricity produced using natural gas, as collected by Monthly Electricity Supply and Disposition (survey number [2151](#)) survey, and an efficiency ratio collected through the Annual Survey of Electric Power Thermal Generating Station Fuel Consumption Survey (survey number [2196](#)).

Natural gas liquids (NGLs)

Data presented in the table are a summation of propane, butane, and ethane only. Pentanes plus and condensates are included in the crude oil data. Propane, butane, and ethane can be produced either at refineries (secondary energy source) or at gas/fractionation plants (primary energy source). Aside from production, none of the supply and disposition variables can be separated based on where the natural gas liquids were produced. Since production at gas/fractionation plants is much higher than production at refineries, all data (except production), is included as a primary energy source. Production of NGLs at refineries is included in the refined petroleum products production variable. The volume of NGLs produced at refineries is added to the NGLs product using the inter-product transfers supply and disposition variable.

Volumes of NGLs produced at gas plants are gathered from administrative data by the Monthly Crude Oil and Natural Gas Program (survey number [2198](#)).

Volumes of NGLs produced at refineries is collected by the Monthly Refined Petroleum Product Survey (survey number [2150](#)).

Imports and exports are based on customs trade data, which are derived from the administrative records of the Canadian Border Agency and the United States Customs Border Protection.

NGLs stock variation is not presented since a source of monthly stock data at gas plants is not available. Further, availability and net supply are not calculated since complete monthly information on NGLs is not available.

Primary electricity, hydro, nuclear, and other renewables

Primary electricity data is collected through the Monthly Electricity Supply and Disposition Survey (survey number [2151](#)).

Production of electricity generated from combustible fuels is included under secondary electricity, thermal.

As virtually all electricity generation is supplied to a grid system, it is not possible to separate primary and secondary electricity, except for production. Primary production data consists of a summation of electricity generated by hydro, nuclear, tidal, wind and solar.

Imports and exports are a summation of all types of electricity.

Primary energy

Data presented in the table are a summation of coal, crude oil, natural gas, natural gas liquids, primary electricity, and renewable fuels.

Refined petroleum products

Data presented in the table are a summation of asphalt, aviation gasoline (blending components and finished), diesel, kerosene, kerosene type jet fuel, light fuel oil, lubricants, miscellaneous products, motor gasoline (blending components and finished), other hydrocarbons, petrochemical feedstocks, petroleum coke, refinery propane, refinery butane, refinery ethane, refinery olefins, residual fuel oil, special naphthas, still gas, and unfinished oils. With the exception of butane, net production is used in the calculation of refined petroleum product production instead of production. Net production is production minus inputs.

Refined petroleum products data are collected by the Monthly Refined Petroleum Product Survey (survey number [2150](#)), except for trade data and refined petroleum products transformed to electricity.

Imports and exports are based on customs trade data, which are derived from the administrative records of the Canadian Border Agency, the United States Customs Border Protection, and the Energy Information Agency.

The volume of refined petroleum products transformed to electricity is calculated based on the quantity of electricity produced using petroleum, as collected by Monthly Electricity Supply and Disposition Survey (survey number [2151](#)), and an efficiency ratio collected through the Annual Survey of Electric Power Thermal Generating Station Fuel Consumption Survey (survey number [2196](#)).

Renewable fuels

Data presented in the table are a summation of fuel ethanol (denatured), biodiesel (FAME), and renewable diesel (HDRD). Renewable fuels transformed to refined petroleum products represents the amount of renewable fuels blended into petroleum products (i.e. ethanol blended into motor gasoline, biodiesel and renewable diesel blended into diesel, etc.)

Renewable fuels production data are collected through the Monthly Renewable Fuels Survey (survey number 5294).

Imports and exports are based on customs trade data, which are derived from the administrative records of the Canadian Border Agency and the United States Customs Border Protection.

Stock variation includes stocks held at renewable plants, as collected by the Monthly Renewable Fuels Survey, as well as renewable fuel stocks held at refineries, terminal, and upgraders, as collected by the Monthly Refined Petroleum Product Survey (survey number 2150).

Net supply in the CEST is adjusted to zero using the “other adjustments” variable. It is assumed that renewable fuels do not have a stand-alone end use and therefore net supply should equal zero.

Secondary electricity

As virtually all generation is supplied to a grid system, it is not possible to separate primary and secondary electricity (except for production). The fuels used to generate secondary electricity are shown in the variable “Transformed to electricity”.

Imports and exports are shown under primary electricity.

Secondary electricity data is collected through the Monthly Electricity Supply and Disposition Survey (survey number [2151](#)).

Secondary energy

Data presented in the table are a summation of coke, refined petroleum products, and secondary electricity.

Total primary and secondary energy

Data presented are a summation of all products in the table. Production of total primary and secondary energy is not published, since adding primary and secondary production would result in double counting of energy. Additionally, availability and net supply are not published since production is not available.

Appendix A: Conversion Factors

Table A1

Table summary

This table displays the results of Table A1. The information is grouped by Fuel Type (appearing as row headers), Conversion factor (appearing as column headers).

Fuel Type	Conversion factor
Coal	
Anthracite	0.02770 TJ/MT
Imported bituminous	0.02982 TJ/MT
Canadian bituminous	
Nova Scotia	0.02896 TJ/MT
Not Nova Scotia	0.02837 TJ/MT
Sub-bituminous	
Quebec, Ontario, Manitoba, and Yukon	0.02079 TJ/MT
Newfoundland and Labrador, Prince Edward Island, Nova Scotia, Yukon, Northwest Territories, and Nunavut	0.01915 TJ/MT
New Brunswick	0.02642 TJ/MT
Saskatchewan, Alberta, and British Columbia	0.01844 TJ/MT
Lignite	
Saskatchewan	0.01629 TJ/MT
Not Saskatchewan	0.01600 TJ/MT
Coke	0.02883 TJ/MT
Crude oil and equivalents	
Light, medium, and synthetic	0.03851 TJ/m ³
Heavy and bitumen	0.04090 TJ/m ³
Condensate	0.03517 TJ/m ³
Pentanes plus	0.03517 TJ/m ³
Electricity	0.00360 TJ/MWH
Natural gas liquids	
Butane	0.02844 TJ/m ³
Ethane	0.01722 TJ/m ³
Propane	0.02531 TJ/m ³
Refined petroleum products	
Asphalt	0.04446 TJ/m ³
Aviation gasoline, blending components and finished	0.03352 TJ/m ³
Diesel	0.03835 TJ/m ³
Kerosene	0.03768 TJ/m ³
Kerosene-type jet fuel	0.03740 TJ/m ³
Light fuel oil	0.03880 TJ/m ³
Lubricants	0.03916 TJ/m ³
Miscellaneous products	0.03982 TJ/m ³
Motor gasoline, blending components and finished	0.03345 TJ/m ³
Other hydrocarbons	0.03982 TJ/m ³
Petrochemical feedstock	0.03517 TJ/m ³
Petroleum coke	0.04489 TJ/m ³
Refinery olefins	0.03982 TJ/m ³
Residual fuel oil	0.04250 TJ/m ³
Special naphtha	0.03517 TJ/m ³
Still gas	0.04118 TJ/m ³
Unfinished oils	0.03982 TJ/m ³
Renewable fuels	
Ethanol	0.02342 TJ/m ³
Biodiesel/FAME	0.03518 TJ/m ³
Renewable diesel/HDRD	0.03518 TJ/m ³

Note: Where TJ = terajoule; m³ = cubic metre; MWH = megawatt-hour; MT = metric tonne.