

International Energy Agency (IEA)

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The **International Energy Agency commenced** its operation in 1974 under the auspices of the Organization for Economic Co-operation and Development (OECD). The IEA is the energy forum for 26 Member countries, all from the OECD, to improve the world's energy supply and to promote reliable databases for energy-related information. IEA member governments are committed to sharing energy information, to co-ordinating their energy policies and to co-operating in the development of rational energy programs. IEA publishes monthly reports on electricity, natural gas, prices, and the oil market. The *World Energy Outlook* is the IEA's most comprehensive publication, and is considered " the world's most authoritative source of energy market analysis and projections."

The main IEA sources used by IFs are the **World Energy Balances (WEB) and World Energy Statistics (WES)**, databases associated with the *World Energy Outlook*. They contain variables such as the production, trade, and consumption of coal, oil, gas, electricity, heat, renewables, and waste for OECD countries and over 100 non-OECD countries.



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Data Acquisition

Unlike most data used in IFs, IEA data from the WEB and WES are not open source. The data must be purchased from the IEA and is delivered on two CD-ROMs.[1] Each disc runs on a database management software program called Beyond 20/20 that comes loaded on the

discs, along with the data. Financial support for the purchase of the IEA data is available from a University Library Association grant. Pardee successfully applied for grant funding through this program for the 2017 update with the help of staff at the Anderson Academic Commons at the University of Denver.

Documentation

Full documentation is available for each dataset detailing its contents, structure, definitions, geographical coverage, etc.

World Energy Balances 2016 Database Documentation

World Energy Statistics 2016 Database Documentation

Batch Pull

The IEA update is performed as a batch pull that includes **138 series** using the Batch Data Update feature in IFs. In the display, "IEA" is the Source and the "IEA Countries" country list is used for country concordance. For the Code Location in Source Data portion of the update form, the source Excel must be formatted so that each Code in Source term is in a different column. For example, SeriesEnImportsOilProductsIEA's Code in Source is "Imports.Oil products," so there should be two columns with "Imports" in one and "Oil products" in the next.

Series Codes

Because this is a batch pull, each series needs a Code in addition to a variable name to be imported. The Codes are listed in the DataDict, and should match the series name in the IEA source database. For the 2017 update, series on the WEB and WES discs were organized by two parameters, FLOW and PRODUCT, where FLOW is the first term of the Code and PRODUCT is the second term of the Code. [NOTE: Drag and drop FLOW, PRODUCT, UNIT, and COUNTRY to column and row headers to reconfigure the display in Beyond 20/20.]

Example

Variable: EnImportsOilProductsIEA

Code: Imports.Oil products

FLOW: Imports

PRODUCT: Oil products

The screenshot shows a software interface with a menu bar (File, Edit, View, Dimension, Item, Window, Help) and a toolbar. The main window displays a data table titled 'World Energy Balances (Read-only)'. The table has columns for 'UNIT: ktoe', 'FLOW: Imports', 'PRODUCT: Oil products', and 'TIME' (years 2009-2015). The rows list various countries and regions, including World, OECD Americas, Africa, and others. The data values are numerical, representing energy imports in thousands of tons of oil equivalent (ktoe).

COUNTRY	2009	2010	2011	2012	2013	2014	2015
World	1,035,150	1,102,855	1,126,730	1,147,151	1,181,255	1,193,317	
OECD Americas	126,058	133,423	131,709	120,633	114,604	112,946	123,579
OECD Asia Oceania	92,333	98,273	103,002	115,608	113,526	112,038	111,793
OECD Europe	322,919	334,314	328,962	328,678	340,626	337,684	355,953
Africa	69,219	71,626	78,723	87,152	91,769	93,960	
Non-OECD Americas	58,467	75,458	79,809	83,650	85,747	87,918	
Middle East	62,287	58,842	55,851	65,601	77,459	80,613	
Non-OECD Europe and Eurasia	35,069	37,865	43,991	46,577	38,844	39,243	
Asia (excluding China)	201,391	222,444	231,292	229,160	247,698	265,596	
China (P.R. of China and Hong Kong, China)	67,407	70,611	73,390	70,091	70,983	63,320	
World marine bunkers	x	x	x	x	x	x	
World aviation bunkers	x	x	x	x	x	x	
Albania	1,062	1,085	1,073	990	1,511	1,453	
Algeria	1,304	970	2,158	4,639	5,400	3,122	
Angola	3,254	3,344	3,629	4,748	4,879	5,785	
Argentina	2,770	4,513	5,055	4,640	6,736	6,870	
Armenia	401	428	403	417	372	368	
Australia	15,598	15,942	14,908	18,259	20,131	20,793	25,016
Austria	5,688	6,627	5,547	5,837	5,919	5,701	5,905
Azerbaijan	37	28	27	44	119	285	
Bahrain	687	613	637	732	670	594	
Bangladesh	2,827	2,852	3,876	3,875	3,941	4,373	
Belarus	2,525	1,532	4,164	6,469	67	100	
Belgium	20,582	21,481	22,071	21,003	26,029	22,660	25,289
Benin	1,678	1,893	1,948	2,039	2,179	2,321	
Bolivia	570	726	882	1,017	990	1,099	
Bosnia and Herzegovina	846	770	780	733	740	758	

Pulling and Formatting the Data

Pulling

Ideally, the IEA series are pulled from the discs in bulk. As of the 2017 update, Beyond 20/20 limits the number of records that can be exported at one time, preventing all the data from being exported at once; however, it is possible to pull all records by PRODUCT or FLOW. For example, it is possible to pull all natural gas or oil products series at once from the WEB disc. Pull the data by assembling the correct configuration in Beyond 20/20, then going to File>Save As and saving it as a .xls file. It is also possible to copy and past individual (or a few) series into an Excel by highlighting them, but not a large number of series at once. [NOTE: The directly exported Excel file did not work on Pardee computers due to a policy setting issue, so the data had to be copied and pasted into a new sheet to be manipulated]

Beyond 20/20 Professional Browser - [World Energy Balances (Read-only)]

File Edit View Dimension Item Window Help

UNIT: ktoe PRODUCT: Natural gas

COUNTRY	FLOW	TIME	2009	2010	2011	2012	2013	2014
	Production		7	12	12	13	15	25
	Imports		0	0	0	0	0	0
	Exports		0	0	0	0	0	0
	International marine bunkers		0	0	0	0	0	0
	International aviation bunkers		0	0	0	0	0	0
	Stock changes		0	0	0	0	0	0
	Total primary energy supply		7	12	12	13	15	25
	Transfers		0	0	0	0	0	0
	Statistical differences		0	0	0	0	0	0
	Main activity producer electricity plants (transf.)		0	0	0	0	0	0
	Autoproducer electricity plants (transf.)		0	0	0	0	0	0
	Main activity producer CHP plants (transf.)		0	0	0	0	0	0
	Autoproducer CHP plants (transf.)		0	0	0	0	0	0
	Main activity producer heat plants (transf.)		0	0	0	0	0	0
	Autoproducer heat plants (transf.)		0	0	0	0	0	0
	Heat pumps (transf.)		0	0	0	0	0	0
	Electric boilers (transf.)		0	0	0	0	0	0
	Chemical heat for electricity production (transf.)		0	0	0	0	0	0
	Blast furnaces (transf.)		0	0	0	0	0	0
	Gas works (transf.)		0	0	0	0	0	0
	Coke ovens (transf.)		0	0	0	0	0	0
	Patent fuel plants (transf.)		0	0	0	0	0	0
	BKB/peat briquette plants (transf.)		0	0	0	0	0	0
	Oil refineries (transf.)		0	0	0	0	0	0
	Petrochemical plants (transf.)		0	0	0	0	0	0
	Liquefaction plants (transf.)		0	0	0	0	0	0
	Other transformation		0	0	0	0	0	0
	Energy industry own use		-7	-11	-10	-10	-9	-18
	Losses		0	0	0	0	0	0
	Total final consumption		1	1	2	3	6	7
	Industry		1	1	0	3	6	7
	Iron and steel		0	0	0	0	0	0
	Chemical and petrochemical		0	0	0	0	0	0
	Non-ferrous metals		0	0	0	0	0	0
	Non-metallic minerals		0	0	0	0	0	0
	Transport equipment		0	0	0	0	0	0
	Machinery		0	0	0	0	0	0
	Mining and quarrying		0	0	0	0	0	0
	Food and tobacco		0	0	0	2	4	6
	Paper, pulp and printing		0	0	0	0	0	0

Albania

For Help, press F1 76/76 Memo: Efficiency of electricity an ENG

Formatting

Once the series have been pulled by PRODUCT or FLOW, they need to be cleaned. Missing data are marked with a ".", "x", or "n," so remove these with a Find+Replace. The data can then be imported with the Batch Import tool using the Codes associated with the FLOW and PRODUCT, along with the country name. It may be necessary to also clean the Codes, for example if there is a unit listed parenthetically after the name of the product (i.e. "Solar thermal (TJ-net)").

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
1	Country	Code 1	Code 2	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974
2	Albania	Production	Natural gas												105.602	121.526	159.305	170.1
3	Albania	Imports	Natural gas												0	0	0	
4	Albania	Exports	Natural gas												0	0	0	
5	Albania	International marine bunkers	Natural gas												0	0	0	
6	Albania	International aviation bunkers	Natural gas												0	0	0	
7	Albania	Stock changes	Natural gas												0	0	0	
8	Albania	Total primary energy supply	Natural gas												105.602	121.526	159.305	170.1
9	Albania	Transfers	Natural gas												0	0	0	
10	Albania	Statistical differences	Natural gas												0	0	0	
11	Albania	Main activity producer electricity plants (transf.)	Natural gas												0	0	0	
12	Albania	Autoproducer electricity plants (transf.)	Natural gas												0	0	0	
13	Albania	Main activity producer CHP plants (transf.)	Natural gas												0	0	0	
14	Albania	Autoproducer CHP plants (transf.)	Natural gas												0	0	0	
15	Albania	Main activity producer heat plants (transf.)	Natural gas												0	0	0	
16	Albania	Autoproducer heat plants (transf.)	Natural gas												0	0	0	
17	Albania	Heat pumps (transf.)	Natural gas												0	0	0	
18	Albania	Electric boilers (transf.)	Natural gas												0	0	0	
19	Albania	Chemical heat for electricity production (transf.)	Natural gas												0	0	0	
20	Albania	Blast furnaces (transf.)	Natural gas												0	0	0	
21	Albania	Gas works (transf.)	Natural gas												0	0	0	
22	Albania	Coke ovens (transf.)	Natural gas												0	0	0	
23	Albania	Patent fuel plants (transf.)	Natural gas												0	0	0	
24	Albania	BK&E/peat briquette plants (transf.)	Natural gas												0	0	0	
25	Albania	Oil refineries (transf.)	Natural gas												0	0	0	
26	Albania	Petrochemical plants (transf.)	Natural gas												0	0	0	
27	Albania	Liquefaction plants (transf.)	Natural gas												0	0	0	
28	Albania	Other transformation	Natural gas												0	0	0	
29	Albania	Energy industry own use	Natural gas												0	0	0	
30	Albania	Losses	Natural gas												0	0	0	
31	Albania	Total final consumption	Natural gas												105.602	121.526	159.305	170.1
32	Albania	Industry	Natural gas												0	0	0	
33	Albania	Iron and steel	Natural gas												0	0	0	
34	Albania	Chemical and petrochemical	Natural gas												0	0	0	
35	Albania	Non-ferrous metals	Natural gas												0	0	0	
36	Albania	Non-metallic minerals	Natural gas												0	0	0	
37	Albania	Transport equipment	Natural gas												0	0	0	

Conversions

Most of the necessary conversion for these series are done automatically through the Batch Import form. However, 22 series had to be converted manually for the the 2017 update from terajoules (TJ) to kilotones of energy equivalent (ktoe). The conversion factor used for these series is from the IEA Unit Converter: $TJ \text{ value} * 0.0238845897$. These series include:

EnConBiogasIndustrialIEA
 EnConBiogasOtherIEA
 EnConBiogasTotIEA
 EnConBiomassIndustrialIEA
 EnConBiomassOtherIEA
 EnConBiomassResidentialIEA
 EnConBiomassTotIEA
 EnConBiomassTransportIEA
 EnConSolarThermalTotIEA
 EnConSolarThermIndustrialIEA
 EnConSolarThermOtherIEA
 EnConSolarThermResidentialIEA
 EnExportsBiomassIEA
 EnExpProdBiogasCDIEA
 EnExpProdIndustrialWasteCDIEA
 EnExpProdMunicipalWasteNonRenewableCDIEA
 EnExpProdMunicipalWasteRenewableCDIEA
 EnExpProdnonSpecPrimaryBiomassWasteCDIEA
 EnExpProdSolarThermalCDIEA

EnImportsBiomassIEA
EnProdBiomassIEA
EnExpProdnonspecPrimaryBiomassWasteCDIEA

DataDict

Variable: Variable names were not changed from previous years this data was pulled, and no additional variables were added for the 2017 pull.

Table: These were not changed from previous years this data was pulled.

Code in Source: These were not changed from previous years this data was pulled.

Groups: These were not changed from previous years this data was pulled.

Subgroups: These were not changed from previous years this data was pulled.

Definitions and Units: These were not changed from previous years this data was pulled.

Extended Source Defn: All were marked as "No Extended Source" for 2017 pull.

Units: These were not changed from previous years; the units used in this dataset are BBOE and GwHr.

Years: Years for every series were changed to available data provided through the database. Most series begin in 1960 with the exception of EnExportsOilIEA, EnImportsOilIEA, and EnProdOilIEA, which begin in 1971. All extend through either 2014 or 2015 as of the 2017 update.

Source: The source name used in the 2017 update for all batch pull IEA series is "IEA (International Energy Agency) Batch Pull."

Original Source: The original source used in the 2017 update for all series is the "World Energy Outlook."

Notes: Notes were updated to reflect the source disc for the series (WEB or WES), any conversion factors used, and the appropriate initials.

Aggregation: Aggregations were not changed from previous updates.

Disaggregation: Disaggregations were not changed from previous updates.

Name in source: Names were updated based on the name of each variable as it is displayed in the Beyond 20/20 database format; generally matches the Code in Source.

Decimal places: These were not changed from previous years this data was pulled.

Country Concordance: IEA Countries were used (and updated for the 2017 pull, see below).

Formula: These were not changed from previous years this data was pulled, and are either blank or convert data to BBOE or GwHr.

Preprocessor Series

Of the 138 IEA Batch Pull series, 24 are preprocessor. These series should be first priority in any IEA batch update. They include:

EnExportsCoalIEA
EnExportsNatGasIEA
EnExportsOilIEA
EnExportsOilProductsIEA
EnExportsPeatIEA
EnExportsTotalIEA
EnImportsCoalIEA
EnImportsNatGasIEA
EnImportsOilIEA
EnImportsOilProductsIEA
EnImportsPeatIEA
EnImportsTotalIEA
EnProdBiodieselIEA
EnProdBiogasIEA
EnProdCoalIEA
EnProdGeothermIEA
EnProdHydroIEA
EnProdNatGasIEA
EnProdNuclearIEA
EnProdOilIEA
EnProdSolarPhotoIEA
EnProdSolarThermIEA
EnProdTideWaveOceanIEA
EnProdWindIEA

Non-Preprocessor Series

There are 114 nonpreprocessor series included in the IEA update. They include:

EnConBiodieselTotIEA
EnConBiodieselTransportIEA
EnConBiogasIndustrialIEA
EnConBiogasolineTotIEA
EnConBiogasolineTransportIEA
EnConBiogasOtherIEA
EnConBiogasTotIEA
EnConBiomassIndustrialIEA
EnConBiomassOtherIEA
EnConBiomassResidentialIEA
EnConBiomassTotIEA
EnConBiomassTransportIEA
EnConCoalIndustrialIEA
EnConCoalOtherIEA

EnConCoalResidentialIEA
EnConCoalTotIEA
EnConCoalTransportIEA
EnConCombustRenewWasteIndustrialIEA
EnConCombustRenewWasteOtherIEA
EnConCombustRenewWasteResidentialIEA
EnConCombustRenewWasteTotIEA
EnConCombustRenewWasteTransportIEA
EnConElecIndustrialIEA
EnConElecOtherIEA
EnConElecResidentIEA
EnConElecTotIEA
EnConElecTransportIEA
EnConGeothermIndustrialIEA
EnConGeothermOtherIEA
EnConGeothermResidentialIEA
EnConGeothermTotIEA
EnConNatGasIndustrialIEA
EnConNatGasOtherIEA
EnConNatGasResidentialIEA
EnConNatGasTotIEA
EnConNatGasTransportIEA
EnConOtherBiofuelsIndustrialIEA
EnConOtherBiofuelsTotIEA
EnConOtherBiofuelsTransportIEA
EnConSolarThermalTotIEA
EnConSolarThermIndustrialIEA
EnConSolarThermOtherIEA
EnConSolarThermResidentialIEA
EnExportsBiodieselIEA
EnExportsBiogasolineIEA
EnExportsBiomassIEA
EnExportsCombustRenewWasteIEA
EnExportsElecGwHrIEA
EnExportsElecIEA
EnExportsOtherBiofuelsIEA
EnExpProdBioDieselsCDIEA
EnExpProdBiogasCDIEA
EnExpProdBiogasolineCDIEA
EnExpProdCharcoalCDIEA
EnExpProdIndustrialWasteCDIEA
EnExpProdMunicipalWasteNonRenewableCDIEA
EnExpProdMunicipalWasteRenewableCDIEA
EnExpProdnonsecPrimaryBiomassWasteCDIEA
EnExpProdOtherLiquidbiofuelsCDIEA
EnExpProdOtherSourcesCDIEA
EnExpProdPrimarySolidGasCDIEA
EnExpProdSolarThermalCDIEA
EnExpProdSPVCDIEA
EnExpProdTideWaveOceanCDIEA

EnExpProdWindCDIEA
EnImportsBiodieselIEA
EnImportsBiogasolineIEA
EnImportsBiomassIEA
EnImportsElecGwHrIEA
EnImportsElecIEA
EnImportsOtherBiofuelsIEA
EnOutputElecCoalCDIEA
EnOutputElecCombustibleRenewableWasteCDIEA
EnOutputElecCrudeNGLFeedstocksCDIEA
EnOutputElecElectricityCDIEA
EnOutputElecGasCDIEA
EnOutputElecGeothermalCDIEA
EnOutputElecHeatCDIEA
EnOutputElecHydroCDIEA
EnOutputElecNuclearCDIEA
EnOutputElecOilProductsCDIEA
EnOutputElecPeatCDIEA
EnOutputElecSolarWindOtherCDIEA
EnOutputElecTotalCDIEA
EnProdBiogasolineIEA
EnProdBiomassIEA
EnProdCoalCDIEA
EnProdCombustibleRenewableWasteCDIEA
EnProdCombustRenewWasteIEA
EnProdCrudeNGLFeedstocksCDIEA
EnProdElectricityCDIEA
EnProdGasCDIEA
EnProdGeothermalCDIEA
EnProdHeatCDIEA
EnProdHydroCDIEA
EnProdNuclearCDIEA
EnProdOilProductsCDIEA
EnProdOtherBiofuelsIEA
EnProdPeatCDIEA
EnProdSolarWindOtherCDIEA
EnProdTotalCDIEA
EnTPESCoalCDIEA
EnTPESCombustibleRenewableWasteCDIEA
EnTPESCrudeNGLFeedstocksCDIEA
EnTPESElectricityCDIEA
EnTPESGasCDIEA
EnTPESGeothermalCDIEA
EnTPESHeatCDIEA
EnTPESHydroCDIEA
EnTPESNuclearCDIEA
EnTPESOilProductsCDIEA
EnTPESPeatCDIEA
EnTPESSolarWindOtherCDIEA
EnTPESTotalCDIEA

Country Concordance

There is a unique country concordance table for the IEA series called "IEA Countries." This table should be checked for accuracy at the time of each update. For the 2017 update, the following countries had to be updated (to the form listed):

Bosnia and Herzegovina
Democratic Republic of the Congo
Hong Kong (China)
Democratic People's Republic of Korea
Libya
Moldova
Mauritius
Niger
Suriname
South Sudan
Tanzania
Viet Nam

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