

# Approximate conversion factors

Statistical Review of World Energy

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<b>Crude oil*</b>	To convert				
	Tonnes (metric)	Kilolitres	Barrels	US gallons	Tonnes/year
From	Multiply by				
Tonnes (metric)	1	1.165	7.33	307.86	–
Kilolitres	0.8581	1	6.2898	264.17	–
Barrels	0.1364	0.159	1	42	–
US gallons	0.00325	0.0038	0.0238	1	–
Barrels/day	–	–	–	–	49.8

\*Based on the worldwide average gravity

<b>Products</b>	To convert					
	Barrels to tonnes	Tonnes to barrels	Kilolitres to tonnes	Tonnes to kilolitres	Tonnes to gigajoules	Tonnes to barrels oil equivalent
From	Multiply by					
Ethane	0.059	16.850	0.373	2.679	49.400	8.073
Liquified petroleum gas (LPG)	0.086	11.600	0.541	1.849	46.150	7.542
Gasoline	0.120	8.350	0.753	1.328	44.750	7.313
Kerosene	0.127	7.880	0.798	1.253	43.920	7.177
Gas oil/diesel	0.134	7.460	0.843	1.186	43.380	7.089
Residual fuel oil	0.157	6.350	0.991	1.010	41.570	6.793
Product basket	0.124	8.058	0.781	1.281	43.076	7.039

Natural gas and LNG	To convert						
	Billion cubic metres NG	Billion cubic feet NG	Petajoules NG	Million tonnes oil equivalent	Million tonnes LNG	Trillion British thermal units	Million barrels oil equivalent
From	Multiply by						
1 billion cubic metres NG	1.000	35.315	36.000	0.860	0.735	34.121	5.883
1 billion cubic feet NG	0.028	1.000	1.019	0.024	0.021	0.966	0.167
1 petajoule NG	0.028	0.981	1.000	0.024	0.021	0.952	0.164
1 million tonnes oil equivalent	1.163	41.071	41.868	1.000	0.855	39.683	6.842
1 million tonnes LNG	1.360	48.028	48.747	1.169	1.000	46.405	8.001
1 trillion British thermal units	0.029	1.035	1.050	0.025	0.022	1.000	0.172
1 million barrels oil equivalent	0.170	6.003	6.093	0.146	0.125	5.800	1.000

Units		
1 metric tonne	= 2204.62 lb	= 1.1023 short tons
1 kilolitre	= 6.2898 barrels	
1 kilolitre	= 1 cubic metre	
1 kilocalorie (kcal)	= 4.1868 kJ	= 3.968 Btu
1 kilojoule (kJ)	= 0.239 kcal	= 0.948 Btu
1 petajoule (Pj)	= 1 quadrillion joules (1 x 10 <sup>15</sup> )	

<b>Units</b>			
1 exajoule (EJ)	= 1 quintillion joules ( $1 \times 10^{18}$ )		
1 British thermal unit (Btu)	= 0.252 kcal	= 1.055 kJ	
1 tonne of oil equivalent (toe)	= 39.683 million Btu	= 41.868 million kJ	
1 barrel of oil equivalent (boe)	= 5.8 million Btu	= 6.119 million kJ	
1 kilowatt-hour (kWh)	= 860 kcal	= 3412 Btu	= 3600 kJ

<b>Calorific equivalents</b>	
<b>One exajoule equals approximately</b>	
Heat units	<ul style="list-style-type: none"> <li>• 239 trillion kilocalories</li> <li>• 948 trillion Btu</li> </ul>
Solid fuels	<ul style="list-style-type: none"> <li>• 40 million tonnes of hard coal</li> <li>• 95 million tonnes of lignite and sub-bituminous coal</li> </ul>
Gaseous fuels	<ul style="list-style-type: none"> <li>• See natural gas and LNG table</li> </ul>
Electricity	<ul style="list-style-type: none"> <li>• 278 terawatt-hours</li> </ul>

<b>All fuel energy content is net or lower heating value (i.e., net of heat of vaporisation of water generated from combustion)</b>	
1 barrel of ethanol	= 0.58 barrels of oil of oil equivalent
1 barrel of biodiesel	= 0.86 barrels of oil of equivalent
1 tonne of ethanol	= 0.68 tonne of oil equivalent
1 tonne of biodiesel	= 0.88 tonne of oil of equivalent

<b>Other terms</b>	
Tonnes	= metric equivalent of tons

<b>Thermal equivalent efficiency factors used to convert non-fossil electricity to primary energy</b>			
Year	Efficiency factor (%)	Year	Efficiency factor (%)
1965-2000	36.0	2011	38.6
2001	36.2	2012	38.8
2002	36.5	2013	39.1
2003	36.7	2014	39.3
2004	36.9	2015	39.5
2005	37.2	2016	39.8
2006	37.4	2017	40.0
2007	37.6	2018	40.2
2008	37.9	2019	40.4
2009	38.1	2020	40.5
2010	38.4		