Energy Equivalents Converter (toe, tce, boe, MMBtu, Gcal)

Convert an amount of energy between GJ, MWh, MMBtu, Gcal, tonnes of oil equivalent, tonnes of coal equivalent and barrels of oil equivalent.

Method: Unit definitions per NIST SP 811 and the SI Brochure (exact where defined); IEA and OECD energy statistics conventions (1 toe = 41.868 GJ, 1 tce = 29.3076 GJ); ...

Input parameters

Unit system: SI

Parameter	Value	Unit
Energy (choose its unit)	1.0000	toe

Calculated results

Parameter	Value	Unit
In GJ	41.868	GJ
In MWh	11.630	MWh
In MMBtu	39.683	MMBtu
In Gcal	10.000	Gcal
In tonnes of oil equivalent	1.0000	toe
In tonnes of coal equivalent	1.4286	tce
In barrels of oil equivalent	6.8419	boe

Notes for this case

• The oil and coal equivalents are conventions, not properties of a real fuel: 1 toe = 10 Gcal = 41.868 GJ (IEA and OECD), 1 tce = 7 Gcal = 29.3076 GJ, 1 boe = 5.8 MMBtu = 6.119 GJ. National statistics sometimes use other values (India's energy statistics and some company reports differ), so state the factor you use.

Formula and method

$$1\ \text{toe} = 41.868\ \text{GJ}, \quad 1\ \text{tce} = 29.3076\ \text{GJ}, \quad 1\ \text{boe} = 5.8\ \text{MMBtu} = 6.119\ \text{GJ}$$

Variables

E	Energy (choose its unit)	J

Method and standards

Energy equivalents.

Assumptions and limits

- Conventional equivalents; IT calorie and Btu.

References

Unit definitions per NIST SP 811 and the SI Brochure (exact where defined), IEA and OECD energy statistics conventions (1 toe = 41.868 GJ, 1 tce = 29.3076 GJ), Barrel of oil equivalent = 5.8 million Btu

Report details

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Release checks	2 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/general/unit-conversions/energy-equivalents-converter

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.