

Country Nuclear Power Profiles (CNPP)

Structure and Requirements Guide

The Country Nuclear Power Profiles (CNPP) compile background information on the status and development of nuclear power programmes in Member States. The publication summarizes organizational and industrial aspects of nuclear power programmes and provides information about the relevant legislative, regulatory and international frameworks in each State.

The compilation's main objectives are to consolidate information about the nuclear power infrastructure in participating States, and to present factors related to effective planning and management of nuclear power programmes, as well as their implementation, that together lead to safe and economical operations. Its descriptive and statistical overview of the overall economic, energy and electricity situation in each State, and its nuclear power framework is intended to serve as an integrated source of key background information about nuclear power programmes in the world.

The CNPP web site allows reports to be updated as they are revised and delivered to the International Atomic Energy Agency (IAEA) and upon review and approval, making the CNPP more current. The following structure was most recently revised in 2019 to include additional requirements related to nuclear power development and energy reporting. The new structure (template available below) should guide the CNPP Coordinators in compiling the respective country nuclear power profile.

References and sources to support the content should be provided, where references are numbered and cited in the text per IAEA guidelines. All information in tables and charts should include the source specified below the table. If a section is not applicable, or not available, for a particular country, then this should still be included but be stated in the report explicitly.

During compilation, CNPP Coordinators may wish to use the UN's <http://www.un.org/en/member-states/> for the official names of other Member States. In addition, Taiwan, China is the preferred usage in IAEA publications.

Please **only** include information regarding the status of the domestic nuclear power programme, and not about other nuclear technologies (e.g. nuclear medicine).

Lastly, the information provided should be kept brief and concise; as a guide, 15-20 pages is preferred, **while a maximum of 25–30 pages is strongly encouraged** (not including appendix). Please note that historical information may be removed during IAEA review if the report exceeds the suggested number of pages.

A. CNPP REPORT UPDATES

To ensure the success of the CNPP Project, it is essential to keep the CNPP reports current. CNPP reports are requested to be updated or revised **annually** by the requested due date, with a maximum two year delinquency, typically in mid- to late May. Additional updates can be made when new information becomes available by contacting the responsible CNPP Technical Officer(s), M. N. Fisher of the Division of Nuclear Power, Department of Nuclear Energy (email: M.N.Fisher@iaea.org). **The general contact point for CNPP is the following: CNPP.Contact-Point@iaea.org.**

Updated CNPP reports, when reviewed and processed, are published on the CNPP web site. These changes can be made anytime throughout the year. Nevertheless, for the purpose of the annual CNPP publication, a report can be included in a new edition only when delivered to the IAEA **no later than 14 May 2021** – requests for a one month extension of the deadline will be considered on a case by case basis, and the request for extension should be sent in writing (electronic preferred) to the CNPP Contact Point ahead of the deadline.

B. FORMAT REQUIREMENTS

The tool used to upload the CNPP to the online system automatically converts the Word document to HTML. Therefore, the Word document must be formatted with certain styles and those styles **must be named exactly** in the way detailed below in order to be recognized, processed and uploaded correctly using the IAEA tool. Additional guidance on the Agency publication style is available here:

<https://nucleus.iaea.org/sites/iaeastyle/Resources%20for%20Originators/Publishing%20Resources%20Pack.aspx>

Styles must be assigned throughout the report in the following way:

— *The assigned styles for headings (style names must be unified throughout every profile):*

- *Title of report: ‘**Title1**’;*
- *Date of update (i.e. subtitle): ‘**Title date**’;*
- *First section (i.e. 1.): ‘**Chapter title**’
(apply this style also to References, Appendices);*
- *Second section (i.e. 1.1.): ‘**Subsection 1**’
(apply this style also to Coordinator info);*
- *Third section (i.e. 1.1.1.): ‘**Subsection 2**’.*

— *The bookmark ‘**REACTOR**’ has been assigned to Table 5 (list of operational, under construction, cancelled/suspended construction, and long term/permanent shutdown nuclear power reactors, section 2.2.1). The data for Table 5 will then be generated automatically and updated via the Power Reactor Information System (PRIS) database. If you do not want Table 5 to be regenerated, please inform the Technical Officer.*

Generally, formatting should include numbering all tables and figures consecutively and referring to each in the text before it appears, however:

— *The bookmark ‘**Tx**’ must be assigned to each Word table that is not a standard table in the template, where x stands for 1, 2, 3...*

*To clarify, these tables are used to provide additional information and data. They may be used for ease of formatting, for example listing laws in one column and the relevant ratification date in the next. They are **NOT** the official tables providing information as specified in the Structure and Requirements Guide.*

— *Make sure all cells in all tables are properly merged:*

- *Delete any empty rows.*
- *Make sure this does not happen:*

<i>Title broken</i>
<i>up into separate</i>
<i>(but hidden) rows</i>

— *Set all pictures to be formatted as ‘In line with text’ and centred.*

— *Make sure the titles of all figures and tables are centred (and of a standardized format, consistent at least within each profile). Table headings should be above the table in all caps (TABLE 1. HEADING ALL CAPS), while figure captions appear in italics and below the figure (FIG. 1. Caption sentence case).*

C. INTERNATIONAL STANDARDS

- For country names, it is recommended to use UN standards, available here: <http://www.un.org/en/member-states/>
- For units, use SI units (tonnes = 1000 kg) whenever used.
- For maps, when used for a grid system or NPP location it is **strongly recommended** to use official UN maps (<http://research.un.org/en/maps/find> or www.un.org/gis/). Non-UN maps are subject to removal by the IAEA.
- For numbers, it is recommended to use the international standard (ISO 80000-1:2009) (<https://www.iso.org/standard/30669.html>). As such, a dot (point on the line) as the decimal sign and a thin space for thousands separators. (For example 13 678.54.).
- Please use MW(e) and MW(th), rather than MWe and MWth.

D. REPORT STRUCTURE AND GUIDE

- Do not create or provide a table of contents for the profile and **follow the format exactly as it is outlined in this document**.
- Introduce (write out) all acronyms at first use; once they are introduced, use the acronyms consistently. This applies in particular to the names of government agencies and divisions — **if abbreviations are used they should be introduced at first use** (using an official English version if one is available) and then abbreviated consistently throughout the rest of the profile. Otherwise, the full name should be used consistently.
- Date formatting follows chronological order: Day, Month, Year (ex. 1 August 2018).
- Ensure all hyperlinks are functional and that all contact information is current – the use of hyperlinks is highly encouraged (as opposed to references).
- If possible, the names of governmental acts, plans and strategies, as well as names of governmental departments should have references or links.
- Full titles of laws, acts, decrees, as well as agreements, publications etc. should be capitalized, but not when referred to in a shorter form (e.g. “Treaty on the Non-Proliferation of Nuclear Weapons”, but “the treaty aims to prevent...”).
- Only proper nouns should be capitalized; all other nouns should remain lowercase. Even when introducing an acronym, only proper nouns, such as titles of laws, agreements, publications, etc. are capitalized.
- Add your country name into the text below, with no changes to the proposed two paragraphs of the preamble. However, the **initial paragraph should be modified to provide a high level overview of the status of the domestic nuclear power programme or plans**; this paragraph should be between two to four sentences maximum.
- Agency style is to use gender neutral terms. However, if difficult to tell if the text refers to a particular person holding the position, please refer to the position only or to the office itself, for example in which case “chair”, “chairperson”, etc. should be used.
- Table 1 is optional to complete, Tables 2-3 can draw numbers from Reference Data Series-1 in conjunction with other official United Nations energy data, while Tables 4-7 will automatically update from IAEA’s Power Reactor Information System (PRIS).

COUNTRY NAME

(Updated Year)

PREAMBLE AND SUMMARY

Provide one paragraph, ideally two to four sentences, describing the current nuclear power situation in your country. For example, “[COUNTRY NAME] has nuclear power reactors in operation and is planning expansion of existing programmes”, “[COUNTRY NAME] is considering embarking on a nuclear power programme”, etc.

This report provides information on the status and development of nuclear power programmes in [COUNTRY NAME], including factors related to the effective planning, decision making and implementation of the nuclear power programme that together lead to safe and economical operation of nuclear power plants.

The CNPP summarizes organizational and industrial aspects of nuclear power programmes and provides information about the relevant legislative, regulatory and international framework in [COUNTRY NAME].

1. COUNTRY ENERGY OVERVIEW

1.1. ENERGY INFORMATION

For energy units, please refer to Attachment 1.

1.1.1. Energy policy

Briefly describe the current national energy policy and governmental strategies or directives in terms of, for example, independence of the sector, use of domestic resources, importance of market forces and influence of climate change. It is possible to include a short discussion on the energy resources of the country and their impact on energy policy.

Please provide references to relevant documents or web sites to support the text.

1.1.2. Estimated available energy

Complete Table 1 showing estimated reserves of fossil fuels, uranium and potential renewable energy. Further explanation or references of estimated values may be included. Renewables should be given as a projected potential capacity over a 10 year period. Calculation of equivalent in exajoules (EJ) is optional and for renewables should be expressed for a period of 10 years. Additional information on the economic viability of renewable energy sources may be added.

Please add relevant footnotes for further explanation of components, for example if fossil fuel solids include both coal and lignite.

TABLE 1. ESTIMATED AVAILABLE ENERGY SOURCES (*Completion of this table is optional*)

	Fossil fuels			Nuclear	Renewables	
	Coal	Crude Oil	Natural Gas	Uranium	Hydro	Other renewable
Total amount in specific units*	x.x					
Total amount in exajoules (EJ)						

*Solid, Liquid: Million tonnes; Gas: Billion m³; Uranium: Metric tonnes; Hydro, Renewable: TW.

**Please note that uranium estimates does not make assumptions regarding recycling capabilities or a closed nuclear fuel cycle
 —: data not available.

Source: IAEA/NEA Uranium 'Red Book', World Energy Council

1.1.3. Energy Consumption Statistics

There is no need to complete this table, as *the IAEA Reference Data Series-1 (RDS-1)* in coordination with other United Nations data on energy sources will provide numbers for Table 2: <https://www-pub.iaea.org/books/iaeabooks/series/71/Reference-Data-Series>. Please contact the CNPP Contact Point with any questions regarding numbers provided by RDS-1, which are provided officially to and coordinated with the IAEA annually.

TABLE 2. ENERGY CONSUMPTION

	2000	2005	2010	2015	year*	Compound annual growth rate (%) 2000 to year*
Final Energy consumption [EJ]						
- Total						
- Heat and Other						
- Electricity						
- Natural Gas						
- Coal/Lignite/Peat						
- Oil						
- Bioenergy and Waste						

*Latest available data, please note that compound annual growth rate may not be representative of actual average growth.

**Total energy derived from primary and secondary generation sources. Figures do not reflect potential heat output that may result from electricity co-generation.

—: data not available.

Source(s): United Nations Statistical Division, OECD/IEA and IAEA RDS-1

1.2. THE ELECTRICITY SYSTEM

1.2.1. Electricity system and decision making process

Provide a brief description of electricity system including planning the infrastructure. Briefly describe future plans if applicable.

Please provide references to relevant documents or web sites to support the text.

1.2.2. Structure of electric power sector

Briefly describe domestic generation, transmission and distribution networks, including main organizations.

1.2.3. Main indicators

There is no need to complete this table, as *the IAEA Reference Data Series-1 (RDS-1)* in coordination with other United Nations data on energy sources will provide numbers for Table 3: <https://www-pub.iaea.org/books/iaeabooks/series/71/Reference-Data-Series>. Please contact the CNPP Contact Point with any questions regarding numbers provided by RDS-1, which are provided officially to and coordinated with the IAEA annually.

TABLE 3. ELECTRICITY PRODUCTION

		2000	2005	2010	2015	year*	Compound annual growth rate (%) 2000 to year*
Electricity production (TWh)	G/N						
- Nuclear							
- Hydro							
- Geothermal							
- Wind							
- Solar							
- Natural Gas							
- Coal/Lignite/Peat							
- Oil							
- Bioenergy and Waste							
- Other							
- Total**							

*Latest available data, please note that compound annual growth rate may not be representative of actual average growth.

**Electricity transmission losses are not deducted.

—: data not available.

Source: United Nations Statistical Division, OECD/IEA and IAEA RDS-1

TABLE 4. ENERGY RELATED RATIOS

There is no need to complete this graph, as *The IAEA Reference Data Series-1, Reference Data Series-2 and PRIS will provide numbers for Table 4*. Please contact the CNPP Contact Point with any questions, which are provided officially to and coordinated with the IAEA annually.

	2000	2005	2010	2015	year*
Nuclear/total electricity (%)					

*Latest available data.

Source: RDS-1 and RDS-2

—: data not available.

2. NUCLEAR POWER SITUATION

Note: Most of this chapter is applicable to all countries either implementing or considering a nuclear power programme. Some sections (e.g. 2.2, 2.5 and 2.6) may not be applicable to all participating Member States. If the section is not applicable, please keep the section, but note 'Not applicable'. In addition, it is encouraged to present nuclear power or related programmes and its support of United Nations Sustainable Development Goals (SDGs, <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>), as applicable.

2.1. HISTORICAL DEVELOPMENT AND CURRENT ORGANIZATIONAL STRUCTURE

2.1.1. Overview

Provide a brief overview of the main decisions, rationale and events related to the implementation and development of the nuclear power programme, including the major organizations involved in

nuclear development and the organizational structure of the government to support nuclear power operations.

Please provide references to relevant documents or web sites to support the text.

2.1.2. Current organizational structure

Provide a simplified chart(s) that will present the main players involved in the nuclear power programme, their responsibilities and their relationships; primarily structure of the nuclear regulator and operator. In particular, please present the landscape of the general nuclear industry, utilities, regulator and the interactions between the operators, companies or state owned enterprises where possible.

Technical Support Organizations (TSOs) should be clearly outlined in Appendix 2.

2.2. NUCLEAR POWER PLANTS: OVERVIEW

2.2.1. Status and performance of nuclear power plants

Table 5 is bookmarked as 'REACTOR'. The bookmarked table will be automatically updated (replaced) by a table generated from the PRIS database. If you do not want Table 5 to be generated automatically from PRIS, please inform the Technical Officer or responsible CNPP officers.

Warning: Table 5 generated from PRIS contains the most up to date information, which can be inconsistent with information in a text when the report is not updated.

TABLE 5. STATUS AND PERFORMANCE OF NUCLEAR POWER PLANTS

Reactor unit	Type	Net capacity [MW(e)]	Operator	Status	Reactor supplier	Construction date	Grid date	Commercial date	Shutdown/ Cancellation date	UCF for year

For operating reactors, add a brief description of the overall performance. For cancelled constructions please provide a short description of why construction was cancelled.

2.2.2. Plant upgrading, plant life management and licence renewals

Provide a short description of regulatory requirements and strategy on plant upgrading, plant life management and licence renewal. If applicable, please provide an overview of already implemented upgrades and licence renewals. Also include the main decisions, measures and corrective actions implemented based on lessons learned from major nuclear incidents.

Please provide references to relevant documents or web sites to support the text.

2.2.3. Permanent shutdown and decommissioning process

For permanently shutdown reactors, provide a summary of the decommissioning strategy, estimated costs, the responsibility (including financial) for decommissioning and other factors which may affect the current status of nuclear power in the country.

Please provide references to relevant documents or web sites to support the text.

This table may be reproduced from Table 17 in the PRIS annual publication Nuclear Power Reactors in the World (RDS-2).

TABLE 6. STATUS OF DECOMMISSIONING PROCESS OF NUCLEAR POWER PLANTS

Reactor unit	Shutdown reason	Decommission strategy	Current decommissioning phase	Current fuel management phase	Decommissioning licensee	Licence terminated year

2.3. FUTURE DEVELOPMENT OF NUCLEAR POWER SECTOR

Note: This chapter is applicable to all countries planning future development of nuclear power, both (1) those planning expansion of existing programmes, and (2) those countries initiating a nuclear power programme.

2.3.1. Nuclear power development strategy

Provide a brief description of the strategic plan, including (as appropriate):

- *Main decisions that have already been made;*
- *Project framework (time scales, number of units, etc.);*
- *Policies for site selection;*
- *Type of contract (turnkey, split package, multipackage);*
- *Applications of nuclear power (electricity supply, heat supply, water desalination, etc.);*
- *Policies for front end and back end nuclear fuel cycle (mining, converting, enriching, fabricating, reprocessing and managing spent fuel and waste, etc.);*
- *Strategy for funding long term storage of spent fuel and final disposal, waste management and decommissioning.*

Complete Table 7.

TABLE 7. PLANNED NUCLEAR POWER PLANTS

Reactor unit/Project name	Owner	Type	Capacity in MW(e)	Expected construction start year	Expected commercial year

2.3.2. Project management

Provide a description of the main organizations involved in the development of nuclear power (e.g. Nuclear Energy Programme Implementing Organization (NEPIO), owner/operator, stakeholders, construction licence holder, staffing for NP project preparation and implementation). Describe their responsibilities and resources.

Note: The information in this section will depend on how far the project has developed.

2.3.3. Project funding

Provide a summary of funding and financing options being considered (e.g. national or regional government funding, export credit agency, international/foreign or private financing).

2.3.4. Electric grid development

Provide a summary of any required development of the existing grid (e.g. grid expansion and upgrades needed to implement NPP).

Please provide references to relevant documents or web sites to support the text.

2.3.5. Sites

Provide the list of potential sites (if available), their characteristics (e.g. source of cooling water, existing/new site, transport infrastructure, seismicity) and the status of their approval by nuclear and environment regulators (e.g. environmental impact assessment approved).

Please provide references to relevant documents or web sites to support the text.

2.3.6. Public awareness

Provide brief information on public awareness of nuclear power development at national and local levels, in addition to reactions to planned projects. Relevant information also includes surveys related to nuclear power or other public opinion campaigns.

2.4. ORGANIZATIONS INVOLVED IN CONSTRUCTION OF NPPs

Briefly describe the main or anticipated organizations involved in nuclear power plant construction related activities (e.g. architect–engineering companies, reactor suppliers and main component suppliers); also include export activities. If relevant, explain any recent changes in company structure or name.

Describe the policy for national and local industrial involvement, including special facilities, e.g. heavy water production, and the strategy for developing or enhancing industrial capabilities of the country.

2.5. ORGANIZATIONS INVOLVED IN OPERATION OF NPPs

Provide information about the main organizations involved in nuclear power plant operation (e.g. owners, operators, vendors, or supporting organizations).

2.6. ORGANIZATIONS INVOLVED IN DECOMMISSIONING OF NPPs

Provide information about the main organizations (e.g. licensee, contractors) involved in nuclear power plant decommissioning.

2.7. FUEL CYCLE INCLUDING WASTE MANAGEMENT

Provide information on current activities and indicate the organizations responsible. Consider the following stages and providing in the form of a table (if applicable):

- Mining and milling;*
- Uranium conversion;*
- Uranium enrichment;*
- Fuel fabrication;*
- Storage of spent fuel (e.g. wet, dry);*
- Reprocessing and disposal of high level radioactive waste;*
- Disposal of spent fuel.*

*The IAEA outlines the World Distribution of Uranium Deposits, if useful:
<https://infcis.iaea.org/UDEPO/Deposits>.*

2.8. RESEARCH AND DEVELOPMENT

2.8.1. R&D organizations

Provide information on institutes, research centres, etc., independent from the companies listed in the sections above, (e.g. atomic energy commissions or national laboratories). A description of the national policy programmes and funding schemes could be included in this section.

2.8.2. Development of advanced nuclear power technologies

Describe the country's engagement in the development of advanced nuclear power technologies, including implementation plans.

Please provide references to relevant documents or web sites to support the text, including the Advanced Reactors Information Systems (ARIS) where applicable: <https://aris.iaea.org/>.

2.8.3. International cooperation and initiatives

Briefly describe research and development activities carried out jointly with other countries and/or within the framework of international projects (e.g. INPRO, GIF, ITER, IFNEC), technical and industrial cooperation, and transfer of know-how and technology.

2.9. HUMAN RESOURCES DEVELOPMENT

Describe strategy and institutions for human resources development related to nuclear industry, including employment levels reported to parliament or included in annual reports where possible (e.g. numbers to be inclusive of educational institutions, facilities for training operation, maintenance and technical support staff).

2.10. STAKEHOLDER INVOLVEMENT

Describe strategy for interaction and communication with stakeholders (e.g. general public, local government, industry, media, and neighbouring countries).

2.11. EMERGENCY PREPAREDNESS

Briefly present the strategy for emergency preparedness, especially in regard to national coordination or nuclear security efforts. More detailed information should be referenced by a link to related documents.

3. NATIONAL LAWS AND REGULATIONS

3.1. REGULATORY FRAMEWORK

3.1.1. Regulatory authority(s)

Briefly describe the role and responsibilities of the regulatory authority(s).

Include a brief history of the nuclear regulatory body, with key dates outlined, the organizational structure and relation to governmental organizations and the organizations responsible for radiation and environmental protection.

Please provide references to relevant documents or web sites to support the text, including an organizational chart in publishable quality if possible.

3.1.2. Licensing process

Briefly describe the overall licensing process for nuclear facilities, including the processes in pursuit of operating license extensions if applicable. Please provide a chart or other visual showcasing the process, if possible.

3.2. NATIONAL LAWS AND REGULATIONS IN NUCLEAR POWER

Provide a list (with date and reference) of national, domestic laws and regulations on nuclear power in the country, considering for example (note international agreements and cooperation should be included in Appendix 1):

Main laws in nuclear power:

- Nuclear law, establishing responsibilities for different areas;*
- Civil nuclear liability;*
- Establishing a regulatory body;*
- Implementing IAEA safeguards;*
- Rules for environmental protection;*
- Protection of intellectual property rights;*
- Import and export controls of nuclear material and items;*
- Security principles, including physical protection of nuclear material and facilities and protection of sensitive information;*
- Roles of national government, local government and stakeholders*
- Other publications or strategies relevant to national nuclear energy development or projections.*

Main regulations in nuclear power:

- Regulation for establishing an authorization system, responsibilities of the operator, inspection and enforcement;*
- Site selection and approval;*
- Radiation protection, including protection of the public, employees and the environment;*
- Safety of nuclear installations;*
- Radioactive waste and spent fuel management, including storage and disposal;*
- Decommissioning, including funding and institutional control;*
- Emergency preparedness;*
- Transport of radioactive material.*

REFERENCES

Provide a reference list (with numbered references that are cited in the text) and suggested reading for more detailed information. Please follow the IAEA guidelines and style to the greatest extent possible.

APPENDIX 1: INTERNATIONAL, MULTILATERAL AND BILATERAL AGREEMENTS

Provide a table (with dates and references) of international agreements in the following categories:

- *International treaties, conventions, and agreements signed/ratified by the country (see the following web site for additional details: <http://ola.iaea.org/ola/treaties/iaea-related.html>);*
- *Cooperation agreements with the IAEA in the area of nuclear power;*
- *Bilateral agreements with other countries or organizations signed/ratified by the country in the field of nuclear power.*

APPENDIX 2: MAIN ORGANIZATIONS, INSTITUTIONS AND COMPANIES INVOLVED IN NUCLEAR POWER RELATED ACTIVITIES

*Provide contact details for organizations as mentioned in Sections 2 and 3 (e.g. name, address, telephone number, facsimile number, email address, **web site address**, main activities and production capabilities).*

Present the list in the form of a table, and present Technical Support Organizations (TSOs) under its own section or separate table.

Coordinator information

Name of report coordinator(s)

Institution

Contact details (including professional/official email and phone number, if suitable for the country coordinator(s) to make public)

Provide the name and contact of the focal person and institution coordinating the CNPP report. If there is more than one appointed country coordinator, please provide the appropriate main contact.

ATTACHMENT 1: PREFIXES AND CONVERSION FACTORS

Do not include the following tables in the profile, as they are only meant as tools for the preparation of the report.

PREFIXES

Symbol	Name	Factor
E	exa	10 ¹⁸
P	peta	10 ¹⁵
T	tera	10 ¹²
G	giga	10 ⁹
M	mega	10 ⁶
K	kilo	10 ³
H	hecto	10 ²
Da	deca	10 ¹
D	deci	10 ⁻¹
C	centi	10 ⁻²
M	mili	10 ⁻³
μ	micro	10 ⁻⁶
H	nano	10 ⁻⁹
P	pico	10 ⁻¹²
F	femto	10 ⁻¹⁵
A	atto	10 ⁻¹⁸

CONVERSION FACTORS FOR ENERGY

To:	TJ	Gcal	Mtoe	MBtu	GWh
From:	Multiply by:				
TJ	1	238.8	2.388 × 10 ⁻⁵	947.8	0.2778
Gcal	4.1868 × 10 ⁻³	1	10 ⁻⁷	3.968	1.163 × 10 ⁻³
Mtoe	4.1868 × 10 ⁴	10 ⁷	1	3.968 × 10 ⁷	11 630
Mbtu	1.0551 × 10 ⁻³	0.252	2.52 × 10 ⁻⁸	1	2.931 × 10 ⁻⁴
GWh	3.6	860	8.6 × 10 ⁻⁵	3412	1

CONVERSION FACTORS FOR MASS

To:	kg	t	lt	st	lb
From:	Multiply by:				
kg (kilogram)	1	0.001	9.84 × 10 ⁻⁴	1.102 × 10 ⁻³	2.2046
t (metric tonne)	1000	1	0.984	1.1023	2204.6
lt (long tonne)	1016	1.016	1	1.12	2240.0
st (short tonne)	907.2	0.9072	0.893	1	2000.0
lb (pound)	0.454	4.54 × 10 ⁻⁴	4.46 × 10 ⁻⁴	5.0 × 10 ⁻⁴	1

CONVERSION FACTORS FOR VOLUME

To:	US gal	UK gal	bbl	ft ³	L	m ³
From:	Multiply by:					
US gal (US gallon)	1	0.8327	0.02381	0.1337	3.785	0.0038
UK gal (UK gallon)	1.201	1	0.02859	0.1605	4.546	0.0045
bbl (barrel)	42.0	34.97	1	5.615	159.0	0.159
ft ³ (cubic foot)	7.48	6.229	0.1781	1	28.3	0.0283
l (litre)	0.2642	0.22	0.0063	0.0353	1	0.001
m ³ (cubic metre)	264.2	220.0	6.289	35.3147	1000	1